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"The Black Hills form a region of majesty and grandeur, heart-stirring beauty of massive ranges and towering peaks, cool, silent woods, high, flowery meadows and wild, tumbling streams."—C. A. Cairns. Here the AMERICAN PHARMACEUTICAL ASSOCIATION will meet during the week of August 26th.

Vol. XVIII, No. 6 JUNE, 1929

JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

TRADE MARK

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Published Monthly by the American Pharmaceutical Association: Office of publication, 20th & Northampton Sts., Easton, Pa. Editorial Office, 10 West Chase Street, Baltimore, Md.

Annual Subscription, $4.00; Single Numbers, 35 Cents.

THE 77th ANNUAL MEETING WILL BE HELD AT RAPID CITY (BLACK HILLS), SOUTH DAKOTA, DURING WEEK OF AUGUST 26, 1929.

F. W. Brown, Lead, So. Dak., Local Secretary

The 1929 Meetings of the American Association of Colleges of Pharmacy, the National Association of Boards of Pharmacy, Conferences of Pharmaceutical Association Secretaries will also be held at Rapid City, same time and place.

For Association Roster and Roster of the Boards of Pharmacy, of Officers of Pharmaceutical Associations, Local Branches, see pages x, xii, xiv, etc.

Entered as second-class Matter, January 23, 1917, at the Post Office at Easton, Pa., under the Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in section 1103. Act of October 3, 1917; authorized July 10, 1918.

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THE RECIPE BOOK.

I DESIRE the privilege of personally expressing my estimate of the worth of the PHARMACEUTICAL RECIPE BOOK, recently published by the ASSOCIATION.

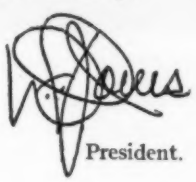
I speak from the position of one who for a lifetime has experienced the needs of a small town drug store in supplying the demands of rural and nearby smaller town communities. A city of twelve thousand in my section of the country occupies the same relative position as a community of fifty thousand farther east—namely, it is a trading center with a radius of two hundred miles. We, therefore, are in the position of a store to which people come to seek supplies for their unusual requirements.

These requirements are largely covered by the subjects treated under the various headings of the RECIPE BOOK.

I want to congratulate, as well as express my appreciation to, the committee for the excellence of their work. At the same time I desire to commend the book to the careful consideration of every retail pharmacist of the smaller towns throughout the United States, knowing that it will meet many needs and solve many knotty problems that arise in their every-day experience, thereby giving them the opportunity of rendering to their community the service that such patronage anticipates of their local druggist.

This book, in my opinion, should be associated with the United States Pharmacopœia and National Formulary, and I must say that they form a trio hard to beat.

Yours most sincerely,



President.

Watertown, S. D., June 1929.

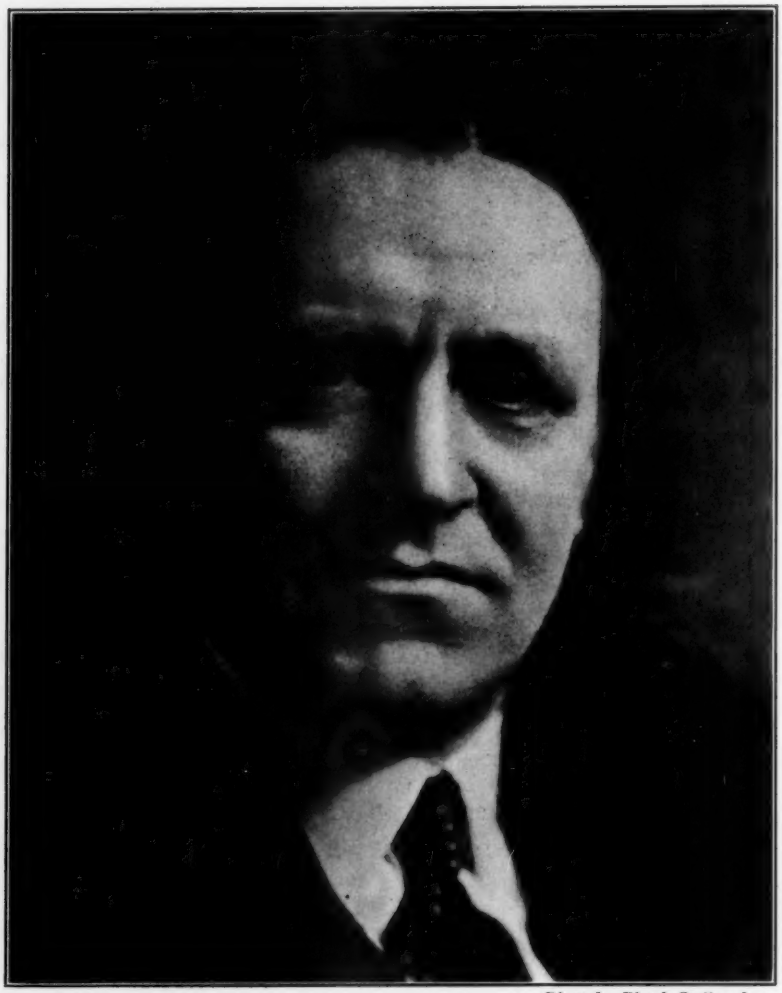


Photo by Blank-Stoller, Inc.

S. B. PENICK.

JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

VOL. XVIII JUNE, 1929 No. 6

SYDNOR BARKSDALE PENICK.

The president of the American Drug Manufacturers' Association, for 1929–1930, is a native of the "Old Dominion." He was born at Culpeper, March 26, 1882, the son of Giles Albert Penick and Werta Dorset Penick. He received his early education in private schools of Virginia. His first employment in the drug business was with Strother Drug Company, at Lynchburg, of which his brother, D. M. Penick is president, and several years later was given the management of the Company's branch at Bristol, Tenn.

In 1905, Mr. Penick came to New York City where, in 1913, he entered business on his own account. This enterprise had a modest beginning but has grown to large proportions; several branches have been established and a collection depot for drugs is maintained at Asheville, N. C.

Mr. Penick takes a lively interest in drug trade associations, the one nearest to him is the organization of which he is now the president. He is a member, and also treasurer, of the Drug and Chemical Club, New York, and holds membership in the American Chemical Society and in the AMERICAN PHARMACEUTICAL ASSOCIATION.

Mr. Penick has a lieutenant-colonel's commission in the Reserve Officers' Corps, is a member of the New York Southern Society and of the Essex Fells Country Club (Essex Fells, N. J.). Before removing to New York City, Mr. Penick married Margaret Henry Dabney, of Lynchburg; they have five children, one of whom, Sydnor Barksdale, Jr., is associated in business with his father.

EDITORIAL

E. G. EBERLE, EDITOR 10 West Chase St., BALTIMORE, MD.

THE HEADQUARTERS BUILDING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION—A UNIT IN WASHINGTON IMPROVEMENT PLANS.

MEMBERS of the AMERICAN PHARMACEUTICAL ASSOCIATION, all who have given to the project of establishing the Headquarters Building in Washington, and pharmacists generally will be interested in the letter printed herewith. The Committee on Public Buildings and Grounds of the United States Senate and the Commission of Fine Arts pass on buildings to be erected and those who will occupy the area to be developed, improved and beautified in the section wherein the Headquarters Building of the AMERICAN PHARMACEUTICAL ASSOCIATION will be a unit. The letter of Chairman Charles Moore, of the Fine Arts Commission, brings the project of the ASSOCIATION to the attention of Congress and includes its building site in the great monumental thoroughfare from the Capitol to the Lincoln Memorial. Certainly this will stimulate the interest of many who have not heretofore realized what this Institute of American Pharmacy means to Pharmacy. It means among other things that the Headquarters of Pharmacy will stand in one of the most interesting groups of buildings in Washington. The last paragraph of an editorial of the April JOURNAL is repeated:

"American Pharmacy is just now facing some adjustments which are challenging to its future progress. It is indeed encouraging that such satisfactory progress can be reported in the Headquarters Building project, that such a valuable site is ours, that we have the sympathetic and helpful interest of the Commission of Fine Arts and the Parks and Planning Commission, and that we are to have the assistance and guidance of such an architect as Mr. Pope in translating our dreams into a reality."

The letter which follows is from Chairman Moore, communicating information to Hon. Henry W. Keyes, Chairman of the Committee on Public Buildings and Grounds, U. S. Senate, relative to the developments in the section, because of the Pan American Union's desire to add an office building, which request was favorably acted upon. Part of the letter follows:

"Replying to your letter (Hon. Henry W. Keyes) of May 7th, I would say that the location proposed for the Pan American Annex, as authorized in the joint resolution (S. J. Res. 5), is acceptable to the Commission of Fine Arts. When we came to study the plan for the building itself we found:

First. That the triangle between Virginia Avenue and C Street was too small to permit adequate landscape treatment.

Second. That there was no room whatever for expansion, which will undoubtedly come within the next few years.

Third. That the Daughters of the American Revolution have recently built an auditorium which will make this particular area greatly congested.

The chief consideration, however, and the one that led the Commission of Fine Arts to suggest to the Pan American Union the use of the triangle between B Street and Virginia Avenue, as suggested in the joint resolution, was that it is contemplated to occupy the whole area between Seventeenth Street and Twenty-Third Street with a series of buildings of the general character of

the Corcoran Gallery, the Red Cross, the D. A. R. Building and the Pan American Building; that is to say, comparatively small, low buildings, with ample space for gardens in front of them. The idea is to make a frame for the Lincoln Memorial. The type of building contemplated is shown in the National Academy of Sciences Building, which was designed as the first unit along B Street.

There are five possible units. The National Academy of Sciences Building is one. THE AMERICAN PHARMACEUTICAL ASSOCIATION BUILDING, to be built adjacent to it, a building designed in accordance with the idea above adverted to, is the second; the Pan American would be the third; leaving two squares to be taken care of in the future. One of these is already owned by the Government; the other is in private ownership, but at present is under control. This scheme provides a suitable termination for B Street, which is now being developed as the great monumental thoroughfare from the Capitol to the Lincoln Memorial. Changing the triangle to be occupied by the Pan American Annex will be to further the scheme and also to provide room for the expansion of the Pan American when necessary. When these considerations were taken up with Doctor Rowe he brought them to the attention of Secretary of State Kellogg and President Coolidge, and received from them their unqualified indorsement of the proposed change.

Pharmacists now have the greatest opportunity for placing the profession of pharmacy where it rightly belongs for rendering the best service for the public. It requires the united efforts of all engaged in the pharmaceutical activities—let everyone do his part and have a deserved share in the accomplishment of the project which has made progress far beyond early expectations.

COÖPERATION BETWEEN GOVERNMENT DEPARTMENTS CONCERNED WITH THE DRUG INDUSTRY AND THE PHARMACEUTICAL ACTIVITIES.

IT is almost trite to repeat that coöperation between the Government Departments which are concerned with the Drug Industry and the pharmaceutical activities is desirable and necessary; any other attitude is, to say the least, not helpful. Confidence of the public in the officials and in pharmaceutical activities is established and strengthened by coöperation; the departments do not measure up to their opportunities and the divisions of the drug industry are hindered in progress and service, unless there is reasonable coöperation between them. There always is and will be differences of opinion between those who are charged with regulation and administration duties and those who manufacture products in which the question of therapeutics is involved. The investigation and adaptation of new materia medica should not be hindered unnecessarily. Aside from manufacture of medicinal products, the facts must be given some consideration that industries are represented which contribute to the Nation's resources, and that the Government is supported not by one industry but by many. The number of those engaged in the Government Departments, federal and state, is constantly growing, hence those who produce the wealth should be aided as far as this is possible and reasonable, in order that in turn the public will be best served. By no manner of means does this signify encouragement of the manufacture of products without merit or harmful but the proper spirit should be in evidence for rational adjustment of debatable questions, with the thought uppermost that the service of the public is paramount. We are taking the liberty of quoting a paragraph from the recent report of the Council on Pharmacy and Chemistry:

"From year to year appreciation of the Council's work has been increasing, and to-day this body is recognized as an authority in the matter of drugs and drug therapy alike by the medical profession and by the pharmaceutic industry. The physician is becoming aware, to an increasing extent, that the Council's facilities for determining the value of drugs are such as the individual practitioner cannot hope to have; and increasing numbers are availing themselves of the Council's advice and opinion in the prescription of new and unofficial drugs. Far-sighted manufacturers of drugs have found it to be good policy to introduce new products only if these present some real merit. Before actually putting a drug on the market these manufacturers regularly consult the Council and avail themselves of the expert knowledge which this body gives for the asking. They have even become more sympathetic toward the Council's most difficult task—the rational naming of drugs. They recognize that the question of nomenclature is fundamental and that the Council's provisions are eminently fair and necessary."

The important fact must not be lost sight of that the medical and pharmacal service rendered is in the interest of the public.

We are pleased to note that the Parker Bill, in which recognition is given to pharmacists, has been re-introduced by Congressman Parker.

PERSEVERING PHARMACISTS.

THE *Washington Star* (Washington, D. C.) recently published an editorial under above caption; it follows:

"After all is said and done, notwithstanding the present bumper crop of jests and gibes at the expense of the modern drug store, the pharmacist is a person of importance. His place of business, be it his own enterprise or be it a link in a Nation-wide chain owned by a department-store-minded corporation, may be a combination restaurant, beauty parlor, toy shop, booksellers', tobacconists' and sporting goods emporium. None the less, medicines, proprietary and compounded, are still sold there and nowhere else and are in the final analysis, the germ of the establishment. Somewhere back of a partition a careful eye, a steady hand and an educated brain are skilfully concocting mixtures which, to him who puts them in his insides, are of an importance of the highest order.

"The pharmacist once was a pretty important person in a community or a neighborhood. His activities have so widened that customers are apt to drop in on his premises as naturally and as thoughtlessly as on those of a ten-cent store. But let there be a physiological emergency, internal or external, and he who is concerned therewith is conscious instantly of the difference between the drug and all other stores. There are recent indications that the professional importance of the pharmacist is receiving more marked attention. Not long ago representatives of druggists' and pharmacists' associations, appearing before the House military affairs committee, urged the establishment of a pharmacy corps in the Army. They told that committee that sometimes soldiers untrained in the pharmaceutical profession had to be intrusted with filling important prescriptions, some of them even containing narcotics, and they urged passage of legislation creating the needed corps of accurately trained men, some of them to hold commissioned rank. This is logical. The work of the best army surgeon in the world can be nullified by a well-meaning but ignorant and untrained pharmacist.

"A day or two ago the AMERICAN PHARMACEUTICAL ASSOCIATION asked President Hoover for recognition, through appointment of an eminent pharmacist, to a

place on the Chief Executive's law-enforcement, fact-finding commission. This, too, appears logical, because of the close hook-up between law enforcement and narcotics and intoxicants."

The Washington Star has editorially depicted the "modern drug store" and also has given its version of the service rendered by pharmacists. While the description of the "modern drug store" may not accord with the desires of a great many, it is far better to have the paper express its views without camouflage; certainly, *The Star* has an understanding of what pharmacists are doing and want to do and of the value of the services which pharmacists may render. Publication of news matter and comments in editorials as that of a recent issue of the *London Lancet*, and news items concerning errors that would probably have been followed by fatal results, and of recent deaths due to preventable errors, will after a time awaken the public to a realization that civilians and soldiers are not always receiving the protection they should have and to which they are entitled.

An editorial on "Common Interests," of the May issue of the JOURNAL has a bearing on the foregoing.

The following from the presidential address of Dr. Joseph M. Toner (1874), of the American Medical Association is applicable because it relates to observation of activities by the layman.

"He who does not constantly keep adding to his knowledge, and increasing his resources, must soon fall behind the more enterprising and better informed of his contemporaries. The physician who does not know that the community in which he lives is keeping a constant watch upon him, and contrasting his knowledge, skill and success in his profession with those of the best and most successful medical men within the range of their reading or acquaintance, shuts his eyes to an important fact of great interest to himself."

FIFTH INTERNATIONAL CONGRESS OF MILITARY MEDICINE AND PHARMACY.

IT is regretted that no pharmacist was delegated to be present at the Fifth International Congress of Military Medicine and Pharmacy held in London, May 6th–11th. While the Bill providing for representation at the Congress was passed by the Senate and House, we have been informed that it did not receive the signature of the President, which was necessary to provide the means for defraying the expenses of the delegates. We are further advised that the representatives from the United States paid their own expenses, resided in England, or were going abroad on another mission. Certainly the United States should be properly represented at the next Congress.

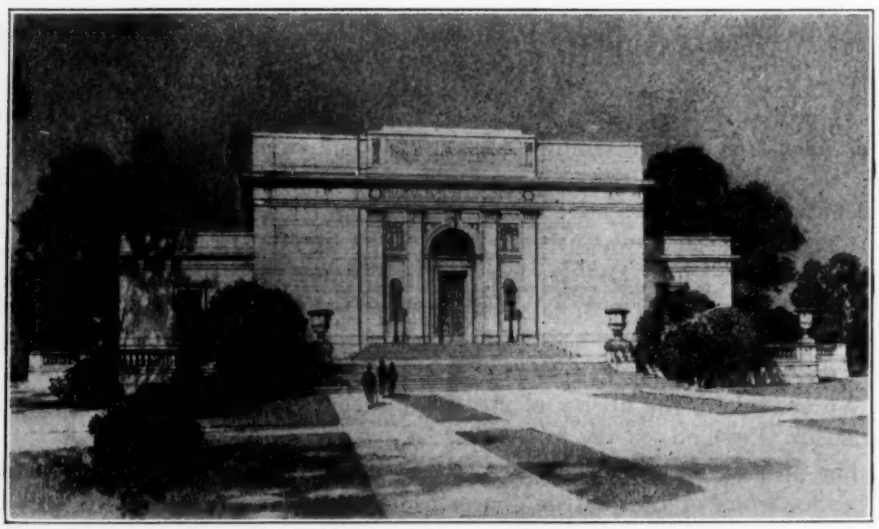
We are taking the liberty of abstracting from the report in the *Journal and Pharmacist* (England) in the following:

The pharmaceutical officers of foreign armies attending the Congress met at the headquarters of the British Pharmaceutical Society on May 10th. Colonel Thomann, of Switzerland, called the meeting to order. The Congress adopted the practice, now generally followed at international gatherings, of electing several

chairmen, in order to distribute the presidential honors. Under this arrangement Colonel Breteau (France), Colonel Pagniello (Italy), and Major Roldan y Guerrero (Spain) occupied the chair in turn during the sessions. The subject under discussion was "The Physical and Chemical Analysis of Glass and Rubber Used in the Medical Services." This was introduced in a paper by Surgeon-Commander F. Lewis Smith, of the Royal Navy, and F. Hooper, Head Pharmacist and Technical Assistant to the Director-General of the Royal Navy (England), and participated in by Farmaceutico Mayor L. M. Eleizegut (Spain), Dr. A. Saint-Sernin (France), Colonel Pagniello (Italy), Colonel Bretau for Colonel Bruere (France), Colonel Thomann (Switzerland) and Mme. Sagajllo (Poland).

President Herbert Skinner of the British Pharmaceutical Society, at a Luncheon given to the delegates—in proposing the toast "Our Guests"—said that it afforded him the greatest pleasure to welcome the members of the pharmaceutical body who had risen to positions of distinction in the military Services, and he knew that he was voicing the views of all British pharmacists in saying that they felt honored by their visit. Speaking of the value of closer international relations, he said that nothing tended to promote the sentiment of friendship among peoples of different nations more than these meetings between members of the same profession. They had a common bond of life interest and duty, and they came to an understanding at once. He paid a tribute to the splendid work that had been done in pharmacy by the members of the craft abroad, and expressed the hope that the visit of the Congress to London would convince the delegates that their British confrères were taking their part in the effort to ensure continued progress.

The subject to be considered at the Sixth International Congress of Military Medicine and Pharmacy will be "Recruitment, Instruction and Functions of Members of the Pharmaceutical Services."



ARCHITECT'S SKETCH OF PHARMACY HEADQUARTERS BUILDING.

REMINGTON HONOR MEDALIST FOR 1929.

The Remington Honor Medal for 1929 has been awarded to Wilbur L. Scoville, Chairman of the Revision Committee, National Formulary V. Following several years of service in the drug business at Bridgeport, Conn., Mr. Scoville matriculated at the Massachusetts College of Pharmacy in 1887, and graduated two years later; after graduation he served as instructor in pharmacy at his *Alma Mater* and as chemist for the E. L. Patch Company. In 1892, he resigned the latter position in order to devote more time to his work as professor of Practical Pharmacy, a chair which he held for about twelve years; during this period he also served as editor of the *New England Druggist* and, later, of the *Spatula*. In 1904, Professor Scoville gave up teaching and became pharmaceutical chemist for the Jayne's stores of Boston and, in 1907, engaged with Parke, Davis & Co., which connection he still holds, his title being chief of the analytical department.

The medalist joined the AMERICAN PHARMACEUTICAL ASSOCIATION in 1891, and since that time the pages of the PROCEEDINGS and of the JOURNAL OF THE AMERICAN

The Remington Honor Medalist of 1929—WILBUR L. SCOVILLE.

Honor Medal—in memory of Joseph Price Remington.

PHARMACEUTICAL ASSOCIATION have recorded many contributions by him; all of them exhibit his deep interest in pharmacy and the aim to be of service. The subject of his address as Chairman of the Scientific Section was "Pharmaceutical Research" and as a result of his recommendation the Committee on Pharmaceutical Research was created.

The greater number of Mr. Scoville's contributions deal with galenical pharmacy, hence solvents, menstrua, vehicles and bases have received careful study, and his reports have added valuable information, not only relative to individual preparations and classes, but in a comprehensive way to the art and science of pharmaceutical manufacturing. His work on the revision of the U. S. Pharmacopœia and National Formulary has been very helpful; this and his contributions to pharmaceutical literature have made the name of Scoville known wherever pharmacy is practiced. The contribution on "The Influence of Acid in the Extraction of Cinchona" won for him the Ebert prize, in 1921; his researches were further recognized by awards of a number of institutions—in 1924, the degree of Master in Pharmacy was conferred by the Philadelphia College of Pharmacy and Science; in 1927, his *Alma Mater* honored him with the degree of Doctor of Pharmacy, and the Master of Science degree was conferred on him, in 1928, by the University of Michigan, and in 1929 the degree of Doctor of Science in Pharmacy was conferred by Columbia University.

Doubtless in selecting the Remington Honor Medalist for 1929 the work of Chairman Scoville in connection with the National Formulary V received first consideration, but thought was also given to other contributions which have in a general way been referred to. As Vice-Chairman of the previous Revision Committee, on account of the impaired health of the revered and lamented C. Lewis Diehl, he brought the National Formulary IV to completion, and his success prompted the selection of the Chairman of the N. F. V Revision Committee. The AMERICAN PHARMACEUTICAL ASSOCIATION and his co-workers were pleased to give recognition to his services in completing the present edition of the National Formulary by an honorarium and a testimonial. As President L. L. Walton, A. PH. A., stated, in his address, no reward would adequately compensate the members, hence the testimonial and the award are expressions of appreciation for the altruistic services rendered.

A dinner was given on June 5th by the New York Branch, A. PH. A., at the Hotel Empire in honor of Mr. and Mrs. Scoville, following which the formal award was made at the College of Pharmacy of Columbia University.

An account of the formalities of this interesting occasion will be printed in another section of this issue of the JOURNAL; at this time congratulations and good wishes for many more years of happy and useful life are extended to Mr. and Mrs. Scoville. The Remington Honor Medal has always been bestowed on those who have well deserved it; the recipients have rendered distinguished services to pharmacy, and the New York Branch, A. PH. A. has established a commendable means for their recognition.

LOCAL COMMITTEE, RAPID CITY A. PH. A. MEETING.

Back row, left to right: Albert J. Jones, Custer; G. E. Gustin, Hot Springs; Earl Sly, Sturgis; Roy Doherty, Rapid City; W. P. Loesch, Oldham; Mrs. R. H. Ottmann, Rapid City; H. A. Nielsen, Rapid City; H. Vis, Wasta; E. C. Severin, Philip; Hendrick J. Peterson, Sturgis; Mr. Jones, Jr., Custer; Fred Vilas, Pierre.

Front row: Earl Hazeltine, Spearfish; E. Hargens, Hot Springs; C. M. Fallon, Rapid City; L. E. Highley, Hot Springs; F. W. Brown, Lead; C. B. Baldwin, Rapid City; Otto Uhlig, Spearfish and R. H. Ottmann, Rapid City.

SCIENTIFIC SECTION

A PREPARATION OF DIGITALIS SUITABLE FOR INJECTION OR ORAL ADMINISTRATION.*

BY ROBERT A. HATCHER AND HARVEY B. HAAG.

I. METHODS OF PREPARATION.
- *A.* THE METHOD OF THE NETHERLANDS PHARMACOPŒIA V:
  - *a.* Period of Aqueous Extraction.
  - *b.* Period of Chloroformic Extraction.
  - *c.* Evaporation of Aqueous Residue and Extraction of Powder.
  - *d.* Temperature of Liquids during Extraction.
  - *e.* Purification of the Residue of the Chloroformic Extract.
  - *f.* Active Constituents of Digisol.
  - *g.* Stability of Digisol and of the Purified Residue.
    1. *Stability of Digisol Kept in Glass.*
    2. *Stability of the Purified Residue in 0.2 Per Cent Hydrochloric Acid.*
- *B.* METHOD OF PREPARATION RECOMMENDED.

II. EMETIC ACTIVITY.

III. ABSORBABILITY.
- *a.* Rate of Absorption from Muscle.
- *b.* Rate of Absorption from the Gastro-Intestinal Tract.
- *c.* Interval before Action after Intravenous Injection.

IV. PERSISTENCE OF ACTION.

V. SUMMARY AND CONCLUSIONS.

The Council on Pharmacy and Chemistry of the American Medical Association, at the annual meeting, April 6 and 7, 1928, discussed the desirability of admitting a preparation of digitalis suitable for hypodermic injection to the U. S. Pharmacopœia, and the Council offered assistance to the Pharmacopœial Committee of Revision in studying the activity of a preparation of digitalis for hypodermic use. Prof. E. Fullerton Cook, Chairman of the Committee of Revision, suggested that the Council undertake an investigation of Liquor Digitalis ad Injectionem, or Digisol for Injection, which is official in the Netherlands Pharmacopœia V.

No definite problem was submitted to us by the Council on Pharmacy and Chemistry or by the Chairman of the Committee of Revision, hence, we selected from the many questions presenting themselves several which gave promise of a ready solution. We have therefore investigated the following: (1) methods of preparation; (2) emetic activity; (3) absorbability; (4) persistence of action.

The following discussion is based on the results of experiments in which we used 15 specimens of digitalis, varying in activity from the weakest obtainable to the most active. A total of some 226 cats was used in the investigation. No complete protocol is given for the reason that single experiments often involved a variety of determinations, such as the period of extraction required, method of purification of the residue, absorbability, emetic activity and other factors. We are therefore able to give only the results of these experiments in condensed form, with a discussion of their significance.

* From the Laboratory of Pharmacology, Cornell University Medical College, New York City.

I. METHODS OF PREPARATION.

A. The Method of the Netherlands Pharmacopœia V.—Professor Cook kindly supplied a nearly literal translation by Dr. D. Twiss of the directions for making digisol which is practically like that given by Lewis G. Freeman (1). The following is the translation, slightly abridged:

> Add eight parts of water to one part of digitalis No. 30 powder, shake repeatedly during 48 hours at a temperature not above 15°, strain through cloth, allow to settle, decant the clear liquid, filter the rest and add the filtrate to the decanted portion. Shake the watery extract with an equal volume of chloroform in a nearly filled flask, repeatedly and vigorously at intervals during 48 hours, avoiding emulsification so far as possible.
>
> Collect the chloroformic layer; concentrate a certain volume of the watery portion to a thick extract on a water-bath; mix this extract with enough dried sodium sulphate so that pulverization will yield a homogeneous dry powder; shake this with a volume of the collected chloroformic extract equal to that of the aqueous liquid that was concentrated, repeatedly and vigorously at intervals during 24 hours;[1] filter; determine the volume of the chloroform, and distil; treat the residue repeatedly with a volume of water (to be added in portions) equal to that of the chloroform distilled; dissolve 0.8 per cent sterilized sodium chloride in the liquid, filter and sterilize in convenient containers by heating on three successive days for one hour, at 70–80°.
>
> The clear, almost colorless or slightly green-yellow liquid, having an odor of digitalis, has a very bitter taste and foams strongly on shaking. Tested as described for digitalis leaves, a lethal dose should be 2 cc. per Kg. of cat. When 1 cc. digitalis liquid is evaporated and the residue dissolved in 1 cc. concentrated acetic acid, the solution should, after the addition of a trace of ferric chloride, when poured on concentrated sulphuric acid, show a red-violet coloration of the border layer above which a blue-green coloration is observed.

An essentially similar preparation for internal use, containing 12 per cent of alcohol, is also official.

The products of the several stages of the process are indicated for convenience of discussion, as follows: "aqueous filtrate," that obtained after macerating the digitalis with 8 parts of water w/v; "first chloroformic extract," the chloroformic portion separated after shaking the aqueous filtrate with an equal volume of chloroform; "first aqueous residue," the aqueous portion remaining after the separation of the first chloroformic extract; "first chloroformic residue," that obtained after distilling the first chloroformic extract; "second chloroformic extract," the chloroformic portion obtained after evaporating the first aqueous residue, adding dried sodium sulphate, drying, powdering and extracting the powder with the first chloroformic extract; "second chloroformic residue," that obtained after distilling the second chloroformic extract; "fresh second chloroformic extract," the chloroformic portion obtained by evaporating the first aqueous residue, adding dried sodium sulphate and treating the powder with fresh chloroform, instead of using the first chloroformic extract. In some cases the second chloroformic extracts and residues were prepared without evaporating the aqueous residue.

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[1] These directions seem fairly concise. Nevertheless, we received another translation directing that the first chloroformic extract be discarded, and at least one prominent manufacturer informed us that he had interpreted his translation in that way. In order to settle the matter authoritatively, we wrote to Professor W. Storm van Leeuwen, of Leiden, who replied that Professor Bijlsma—the successor of Magnus—stated that a portion of the first chloroformic extract is used later for the extraction of the dried portion.

a. Period of Aqueous Extraction.—The formula of the Netherlands Pharmacopœia is closely similar to that recommended by Sluyters (2) for the extraction of both gitalin and digitalein,[1] except that Sluyters extracted digitalis with water during 24 hours, and he does not specify the period of agitation with chloroform.

In order to determine whether it is necessary to shake the powdered digitalis with water during 48 hours, as the Netherlands Pharmacopœia directs, the following experiment was performed. One hundred fifty grams of digitalis was divided into three equal portions and extracted in the following manner: (1) during 48 hours; (2) during 24 hours; (3) during 2 hours. The purified residues, each from 100 cc. of the first chloroformic extract, were: (1) 35.5 mg., (2) 34.0 mg. and (3) 21.0 mg. The tests showed that the total activity of the purified chloroformic residue obtained after extraction during 24 hours was almost exactly the same as that after 48 hours, hence nothing is gained by the longer period of extraction. The slight yield after aqueous extraction during two hours indicates that this period is insufficient. It is in marked contrast to the rapid extraction with hot water.

b. Period of Chloroformic Extraction.—Several experiments were performed in order to determine the necessary period of extraction of the first aqueous filtrate with chloroform. One hundred twenty-five grams digitalis, of which 100 mg. equalled 1 cat unit,[2] was extracted in the manner directed, during 48 hours, after which 620 cc. of filtrate was obtained. This was divided into two portions. The first portion of 120 cc. of aqueous filtrate was rotated gently with 120 cc. of chloroform in a flask having a capacity of about 500 cc., during two hours; 100 cc. of the chloroformic distillate yielded 41.6 mg. of residue. The second portion of 500 cc. of the aqueous filtrate was rotated gently at intervals during 48 hours, with 500 cc. of chloroform in a flask having a capacity of about 2000 cc. The residue left after the distillation of 100 cc. of chloroformic extract weighed 40.5 mg., or almost exactly the same as that after shaking during two hours.

In another experiment, equal volumes of aqueous filtrate, prepared in the manner described, were shaken with chloroform, as follows: (1) with gentle rotation at intervals during 48 hours; (2) vigorously at intervals during 48 hours; (3) vigorously to form an emulsion several times during 48 hours; (4) vigorously at intervals during 1 hour with complete emulsification. Equal volumes of these four chloroformic extracts yielded practically similar amounts of residue.

It is obvious that the rate of removal of a principle from one liquid by shaking it with another with which it is immiscible depends on several factors including: the solubility of the principle in the first liquid (water); the solubility in the second liquid (chloroform); the concentration of the solution; the degree to which the two liquids are brought into contact, that is, the extent and duration of surface contact in proportion to the total volume. The following illustrates certain of these facts.

Strychnine base is soluble in about 6420 parts of water and in about 7.5 parts of chloroform. When a 1 per cent solution of strychnine sulphate is made alkaline

[1] The composition of digitalein is so variable that the name has no fixed meaning.

[2] The cat unit, described by Hatcher and Brody (3) is that amount of a digitalis body which is required for each Kg. of weight to cause death when it is injected slowly into the vein. We refer to it as the average fatal dose.

by the addition of sodium bicarbonate and is shaken vigorously during one minute with an equal volume of chloroform in a separatory funnel of a capacity twice that of the volume of the combined liquids, all but a trace of the strychnine is removed by the chloroform. On the other hand, morphine base is soluble in about 3340 parts of water and in about 10,000 parts of absolute chloroform (not the official), hence, it requires a very large excess of absolute chloroform to remove all the morphine base from an aqueous solution.[1]

The Netherlands Pharmacopœia directs the shaking of the aqueous filtrate with chloroform in a nearly filled bottle, in order to avoid emulsification, so far as possible. We have found this warning entirely superfluous. It requires little skill to rotate a half-filled flask without forming much emulsion, and usually even after vigorous shaking, the greater part of the chloroform separates on standing some hours, and one can easily separate nearly all the chloroform from the emulsion, which consists almost wholly of chloroform. The emulsion is split readily by shaking it with five volumes of fresh chloroform, or, if one prefers, with the chloroformic extract previously separated. In an experiment in which three portions of 125 cc. each of filtrate were shaken vigorously with chloroform, 124 cc. of the chloroformic extract was recovered in each of two portions, and 110 cc. in the third.

Vigorous shaking in a half-filled vessel breaks up the liquids into small globules, increases the surface areas in contact, and facilitates extraction correspondingly. If a vessel is completely filled with equal volumes of chloroform and the aqueous filtrate, the most vigorous shaking does not break up the two liquids into small globules and the surface areas in contact are increased comparatively little.

The deeper the layers of water and chloroform, the less are the areas of the surfaces, hence, the more vigorous is the shaking required, or the longer the contact for complete extraction. If the chloroformic and watery layers are rotated in a nearly flat vessel of such diameter that the depth of the two liquids does not exceed one or two centimeters, extraction requires only gentle rotation during an hour or two. The more nearly the shape of the vessel approaches to a cylindrical form and the deeper the layers of the liquid, the longer the time required, or the more vigorous the shaking, for extraction, and the figures which we give apply only to conditions approaching those which we have used.

The surface area of one liter of chloroform in a flask having a capacity of 5 liters measured 314 square centimeters, and the depth of the aqueous layer was approximately $3^1/_2$ centimeters. When one rotates a liter of the aqueous filtrate with a liter of chloroform in this flask, the extraction is completed within two hours, but if one were to place the chloroform and the aqueous filtrate in an ordinary bottle of about two liters' capacity, leaving an air space of only a few cubic centimeters, extraction would be very much slower and much more vigorous shaking would be required.

c. Evaporation of Aqueous Residue and Extraction of Powder.—There are several factors in the preparation of the second chloroformic extract that require consideration. Care is taken to maintain the temperature at 15° or lower until the first extraction with chloroform is completed, after which the aqueous residue

[1] Chloroform containing about 4 per cent of alcohol by volume is a far better solvent than absolute chloroform for morphine.

is evaporated on a water-bath or steam-bath, dried with dried sodium sulphate and powdered. The treatment of this powder with a portion of the first chloroformic extract involves a considerable loss of the latter through retention by the powder. It is necessary, therefore, to determine the relative amount of active principle removed in this part of the process and its nature, in order to learn whether it is desirable for the therapeutic actions of the preparation or for reasons of economy.

In order to determine the amount of the active principle removed from the powdered extract, we used a fresh portion of chloroform instead of an aliquot part of the first chloroformic extract, as directed in the official process. The results surprised us, and since our statement will almost certainly lead others to investigate this stage, we shall discuss our results in some detail.

Reference to Sluyters's paper shows that the first extraction with chloroform is designed chiefly to remove bigitalin and gitalin, the latter being partly decomposable in aqueous solution by heat, according to Kraft (4), and that the second part of the process (the evaporation of the aqueous residue and the extraction of the powder with chloroform) is intended to extract digitalein.

Sluyters prepared from the first aqueous residue a substance having an activity equal to 40 per cent of that of the first chloroformic extract, and he also found that the preparation made by the present official method is about 40 per cent more active than the first chloroformic extract alone. He convinced himself that digitalein is extracted by the second part of the process, but he says that the slight difference in yield hardly justifies the more troublesome process. We do not know just what Sluyters meant by digitalein, but he considered it different from the digitalein of Merck used by Hatcher in 1912 (5). Digitalein is available only in an impure form, and Cloetta (6) has shown that it consists of a mixture of active principles in combination with inert matter which renders it soluble in water.

Sluyters's statement concerning the activity of the second chloroformic extraction is directly opposed to our results and we must suppose that he failed to extract nearly so much of the active substance in the first treatment with chloroform as we did in every case. However, it is significant that Sluyters says that it hardly seems worth the trouble to extract the evaporated portion.

In our second experiment, we found that the activity of the first chloroformic residue was equal to that of a corresponding amount of finished digisol, indicating that the second chloroformic extraction was superfluous. We then prepared the second chloroformic extract with fresh chloroform in each of 12 experiments and in every case we found it inert. Each of us conducted the extraction independently but the results were alike.

There are several possible explanations of our failure to extract any active principle in this stage of the process: (1) the total removal of the chloroform-soluble substance in the first extraction; (2) destruction of the active principle by heat during evaporation; (3) conversion of the chloroform-soluble substance into a chloroform-insoluble substance by heat; (4) adsorption of the active principle by the sodium sulphate and inert residue, or other physical change.

(*1*) The first chloroformic extraction does not remove all the chloroform-soluble substance from the aqueous filtrate, and we found that when the first aqueous residue is filtered and then shaken with an equal volume of fresh chloro-

form, the second chloroformic extract contains from about one-fourteenth to about one-fifth as much active principle as the first, the yield depending in part on the skill with which the extraction is made. The second chloroformic residue prepared in this way usually contains a higher percentage of impurity than the first, and it is retained more tenaciously.

In an experiment of December 31, 1928, 200 Gm. of a mixture of five specimens of digitalis was used for the preparation of the first chloroformic extract in the usual manner, except that the aqueous filtrate was shaken with chloroform during two hours. The purified residue obtained after the distillation of 990 cc. of the first chloroformic extract, representing 123.75 Gm. digitalis, weighed 350.0 mg., the test showed that 1.27 mg. equalled 1 cat unit.

The aqueous residue was then divided into two equal portions of 500 cc. each. The first was evaporated in the usual way, 60 Gm. of dried sodium sulphate was added and the mixture was dried and powdered. The powder was treated with 500 cc. fresh chloroform during 24 hours; 450 cc. of this second chloroformic extract was filtered and distilled. The residue weighed 13.4 mg. and when tested on a cat it was found to be inert. The second portion of 500 cc. of aqueous residue was shaken with 500 cc. of fresh chloroform, during two hours. Four hundred seventy cc. of this second chloroformic extract was filtered and distilled. The residue weighed 57.7 mg. and after purification it weighed 37.7 mg. The test showed that 1.47 mg. equalled 1 cat unit. The total activity of the purified residue, representing the second chloroformic extract of 58.75 Gm. of digitalis, was equal to only 26 cat units, while the total activity of an amount of the first chloroformic extract representing an equal weight of digitalis was five times as great. The activity of a given weight of the purified second residue was about 80 per cent of that of an equal weight of the purified first residue. In an essentially similar experiment of February 28, 1929, the total activity of the purified first chloroformic residue was about 14 times that of the second chloroformic residue. This shows that the second chloroformic extraction of the aqueous residue even without evaporation is of doubtful economy because, while the action of the second chloroformic extract is qualitatively like that of the first, the total yield does not justify the labor involved, and we have found that the second chloroformic residue is more difficult to purify than the first.

(*2*) The following shows that the heat used in evaporating the aqueous residue does not destroy the active chloroform-soluble substance, and (*3*) that it does not convert it into a chloroform-insoluble substance. In one experiment, the powder left after the second chloroformic extraction with fresh chloroform was heated to expel the chloroform, the powder was then redissolved in sufficient water to make the volume equal to that of the original aqueous residue and this was shaken with an equal volume of chloroform. The latter extracted a little more of the active substance than was extracted by shaking an equal volume of the unevaporated first aqueous residue with an equal volume of fresh chloroform. This suggested that the addition of sodium sulphate to the aqueous filtrate facilitates the extraction with chloroform. We therefore performed the following experiment.

A fresh aqueous filtrate (which had not been extracted with chloroform) was evaporated and dried sodium sulphate was added in the manner directed for the

preparation of the second chloroformic extract. The powder was treated with fresh chloroform and while the resulting extract was not quite inert, its activity was negligible. The powder was then heated to expel the chloroform and it was dissolved in sufficient water to make it up to the original volume. This was shaken with an equal volume of chloroform, and the resulting chloroformic extract yielded a greater amount of residue than that which we had previously obtained by shaking an equal volume of the original filtrate with chloroform. This shows that the addition of sodium sulphate increased the yield of active principle, and that the heat used in evaporation did not destroy it. Subsequent tests confirmed this, but the difference is only about 12 per cent, hence it does not seem worth while to add the sodium sulphate. A greater amount of impurity was also extracted by the chloroform.

(*4*) The results just described point to adsorption of the active principle or to other physical changes whereby they are rendered insoluble in the dry state. If such a change does occur, it is reversible, as we have shown.

While the official second chloroformic extraction is superfluous, there are several minor points that should be discussed. The extract remaining after the evaporation of the first aqueous residue contains much hygroscopic matter and we have found it necessary to add about 10 Gm. of dried sodium sulphate for every 100 cc. of infusion evaporated. The resulting mass clings to the evaporating dish, and it is hygroscopic and tedious to reduce to a fine powder. The extraction involves the loss of about 12 per cent of the first chloroformic extract, which is retained by the powder. It is tedious to dissolve the second chloroformic residue in water according to the official directions, but the use of a volume of alcohol equal to about 1 per cent of the finished digisol, facilitates this step greatly.

Sluyters reports that the activity of his preparation was equal to about 49 per cent of the total activity of the leaf. We have never succeeded in preparing digisol with an activity greater than about 25 per cent of the total activity of the leaf, and our results are in harmony with those of others who have reported their results to us directly.

d. Temperature of Liquids during Extraction.—The results of Kraft's work and that of Cloetta inclined us to believe that it is unnecessary to maintain a temperature lower than 30° in the liquids during the extraction, and that the directions in the Netherlands Pharmacopœia to avoid a temperature above 15° involves unnecessary inconvenience. Experiments with a single species of digitalis are not absolutely conclusive but limitations of time have prevented our investigating this question with more than one specimen, and we are the more content to limit our study of the question because we know of no evidence to support the view that the inconveniently low temperature is of the slightest advantage.

In this experiment the aqueous filtrate was divided into two portions. The first portion was allowed to stand about 20 hours at a temperature varying from 28° to 23°, after which the purified residue was prepared in the usual manner and tested on cats. One hundred cc. of the chloroformic filtrate yielded 87 mg. of residue and 57 mg. of purified residue, of which 1.25 mg. equals 1 cat unit, this being the activity of the greater number of purified residues. The remainder of the aqueous filtrate was kept cold and the purified residue from it was prepared in the usual manner. One hundred cc. of chloroformic filtrate yielded 74.3 mg.

of residue and 52 mg. of purified residue. The yield of the purified residues and their activity indicate that no decomposition occurs at a temperature of 28° or lower. The fact that extraction at the higher temperature yielded slightly more of the unpurified residue and of the purified than that at the lower is of minor importance. It is possible that the extraction was a little more efficient, though an effort was made to shake both portions equally.

e. Purification of the Residue of the Chloroformic Extract.—One must know something of the nature of the active principles of digitalis and their solubilities in alcohol, in water and in chloroform, in order to understand the problem involved in the purification of a substance which is designed for injection or even for oral administration. The subject is extremely complex and space does not permit of our discussing it exhaustively. The following brief discussion is based partly on personal experience, partly on the work of Kraft (4), but mainly on that of Cloetta (6).

Cloetta believes that only three active principles of digitalis—crystalline digitoxin, crystalline bigitalin and crystalline gitalin—require consideration, though there are negligible amounts of other active substances present in the leaf. He also believes that digitoxin is the chief active principle in digitalis. The pure crystalline digitoxin is insoluble in water but soluble in dilute alcohol and readily soluble in chloroform. Pure crystalline bigitalin is characterized by its slight solubility in available solvents including water, alcohol and chloroform; pure crystalline gitalin is slightly soluble in water, readily soluble in alcohol and in chloroform. All of these substances are extracted from the leaf by water in physical combination with various impurities from which they are separated with difficulty and only with great loss, the yield of pure principle in any case being only a fraction of that existing in the leaf. While it is usually preferable to employ pure principles in therapeutics, convenience and economy dictate the use of impure principles of digitalis in the majority of cases, but it is desirable that any preparation of digitalis that is injected shall contain no more of the impurity than is necessary to hold the active principles in solution.

Simple inspection shows that the digisol of the Netherlands Pharmacopœia contains an odoriferous principle (volatile oil) and coloring matter (chlorophyl), and the fact that it froths when shaken shows the presence of saponin. Mixtures of chloroform, ether and petroleum ether have often been recommended for purifying preparations of digitalis and for the estimation of Keller's so-called digitoxin. We have used this simple procedure in the purification of the first chloroformic residues, and have usually obtained a purified residue of which about 1.25 mg. equals 1 cat unit.

We have not determined the minimum amounts of chloroform, ether and petroleum ether required for the purification of the chloroformic residue and it is almost certain that different amounts will be required with the chloroformic residues of different specimens of digitalis in order to produce a residue of this degree of activity.

In one experiment the purification of 100 mg. of residue by dissolving it in 1 Gm. of chloroform and adding $2^1/_2$ Gm. of ether and $17^1/_2$ Gm. of petroleum ether appeared satisfactory, but in an experiment of February 26, 1929, 308.7 mg. of slightly atypical (sticky) residue was dissolved in 3 Gm. of chloroform and to this was added 7.5 Gm. of ether and 52.5 Gm. of petroleum ether. The pre-

cipitate weighed 226.7 mg. after the removal of 82.0 mg., or 26.6 per cent, of soluble inert substance. The precipitate was redissolved in 8 Gm. of chloroform and to this was added 20 Gm. of ether and 140 Gm. of petroleum ether. The dried precipitate weighed 170 mg., after the removal of 56.7 mg., or 25 per cent, of soluble inert matter.

In the experiment of February 28, 1929, 705 cc. of the first chloroformic extract, representing 88 Gm. of digitalis, yielded 395.8 mg. of residue. This was dissolved in 4 Gm. of chloroform and to it was added 10 Gm. of ether and 70 Gm. of petroleum ether. The soluble inert impurity weighed 118.3 mg.; the active precipitate weighed 277.5 mg.; this was redissolved in 8 Gm. of chloroform and to it was added 20 Gm. of ether and 140 Gm. of petroleum ether. There remained in solution 30.5 mg. of inert impurity, leaving 247.0 mg. of active residue. The first aqueous residue was then treated with 704 cc. of fresh chloroform, the chloroform was distilled leaving 110 mg. of residue. This second chloroformic residue was dissolved in 4 Gm. of chloroform and to it was added 10 Gm. of ether and 70 Gm. of petroleum ether. Sixty-five milligrams of inert matter remained in solution; the purified residue weighed 45 mg. The test showed that 3 mg. of this purified residue equalled 1 cat unit. Hence, it was only 40 per cent as active as an equal weight of the average purified first chloroformic residue, and the total second fresh chloroformic purified residue from 88 Gm. of digitalis had a total activity of only 15 cat units, or about one-fourteenth as great as that of the purified residue of the first chloroformic extract.

Briefly, 1 Gm. of chloroform, 2.5 Gm. of ether and 17.5 Gm. of petroleum ether for each 100 mg. of the first chloroformic residue sufficed for the removal of 118.3 mg. of inert matter, equal to 30 per cent of the weight of the residue, after which twice as much chloroform, ether and petroleum ether removed only about one-fourth as much inert matter. A much larger relative amount of chloroform, ether and petroleum ether removed a larger percentage of inert matter, from the second chloroformic residue, but the purified residue was then less active than that from the first chloroformic extract, that is, it contained a greater percentage of impurity.

In some experiments, we used 4 Gm. of chloroform, 10 Gm. of ether and 70 Gm. of petroleum ether for about 100 mg. of chloroformic residue. The impurity remaining in solution in this mixture was tested in a number of experiments and in every case was found to be inert, but when a smaller proportion of petroleum ether was used, part of the active principles was removed with the impurity. Our results indicate that a larger proportion of chloroform, ether and petroleum ether is necessary for the purification of some extracts than for others but we tentatively recommend the use of 2 Gm. of chloroform, 5 Gm. of ether and 35 Gm. of petroleum ether for 100 mg. of first chloroformic residue.

Cloetta (6) states that digitalis does not contain any active principle which in a pure state is readily soluble in water. He states that pure gitalin is about one-third to one-half as active as pure digitoxin for cats by subcutaneous injection, and for frogs. The purified first chloroformic residues that we prepared were nearly uniformly about one-fourth as active when injected intravenously in cats as Merck's digitoxin, which, however, is not absolutely pure, according to Kraft. At any rate, the unpurified first chloroformic residue is probably about as pure as

it is desirable to have it for intramuscular injection because products of much greater purity are not sufficiently soluble in water for convenient intramuscular injection.

f. Active Constituents of Digisol.—It may seem to the reader that it is incumbent upon an investigator to state the composition of any preparation that he discusses in terms that are in common use or in terms of pure principles of a recognized authority. Unfortunately, it is not possible for us to do this with reference to digisol with exactness though one of us is studying the literature in the effort to learn the relationship of the various so-called digitalis principles in common use and the more or less pure principles that have been described by Nativelle (7), Schmiedeberg (8), Kiliani (9), Kraft (4), Cloetta (6) and others.

Many impure substances prepared from digitalis by different investigators have become established in the literature and in common use under names that were given them by their discoverers who supposed them to be pure principles, but which have been found to be mixtures of various active principles with impurities. Some of these substances, such as crystalline digitaline, or digitoxin, as it is commonly called, consist of nearly pure principles. German digitalin, so-called, is said to consist of about sixty per cent of digitonin and it is probably of very variable composition. The confusion is increased by the fact that similar or nearly identical names have been given to wholly different substances. The general reader is referred to "New and Nonofficial Remedies" (1928), 143–154, published by the American Medical Association, Chicago, for a brief discussion of digitalis principles and preparations.

Special reference has been made to the recent work of Kraft and to that of Cloetta. Some of Kraft's claims have been disproved and it is impossible to state to what extent further investigation will confirm or disprove the main points in Cloetta's work, but at this time it appears to be of fundamental importance, and it is desirable to state the approximate composition of digisol in terms of the active principles described by Cloetta—crystalline digitoxin, crystalline gitalin and crystalline bigitalin, and of digitalin, digitalein and the gitalin of Kraft.

Kraft maintains that cold water does not extract digitoxin from digitalis, but Cloetta found that it constitutes more than one-third of the active principles of the watery extract, and since it is soluble in chloroform, we may be certain that at least a small amount is present in digisol. The remainder of the active substance in digisol consists of crystalline gitalin and crystalline bigitalin and their genins.

Dooley (10), working in this laboratory, showed that tincture of digitalis contains a principle that is eliminated rapidly after its intravenous injection in the cat, and Weiss and Hatcher (11) showed that a rapidly eliminated substance is present in tincture of digitalis, in chloroformic extracts of the infusion prepared with hot water, in ethereal extracts of the preceding, in so-called digitoxin Keller, in a chloroformic percolate of digitalis, in a commercial specimen labelled digitoxin, and in a specimen of crude digitalein. There is little doubt that this rapidly eliminated substance consists of genins of the gitalin group—gitaligenin and bigitaligenin—not of digitoxigenin, which is eliminated slowly.

Weiss and Hatcher prepared a chloroformic extract similar to the first digisol chloroformic extract. They shook a one per cent cold infusion of digitalis with a

nearly equal volume of chloroform. Their first chloroformic residue was identical with that prepared by us in the present investigation, and they found that it contained very little of the rapidly eliminated fraction. They evaporated the infusion left after the first chloroformic extraction, precipitated the inert matter with alcohol, dissolved the residue in water and shook it with chloroform. They obtained about 2 mg. of residue for each gram of digitalis. It consisted almost wholly of the rapidly eliminated fraction, and cats eliminated nearly fatal doses within periods of about three hours.

The results reported by Weiss and Hatcher made it appear almost superfluous to examine digisol for the presence of the rapidly eliminated substance. Nevertheless we have examined it. The method employed is similar to that used by Weiss and Hatcher. It consists in determining the difference between the fatal dose when the drug is injected rapidly and that when it is injected slowly into a vein of the cat. No difference could be detected between the dose required to cause death when the injection was completed within about 30 minutes and that when it was completed in about three hours. This shows that digisol does not contain more than a very small proportion of rapidly eliminated substance (genins of the gitalin group).

The average fatal dose of a purified residue was 1.11 mg. per Kg. when the injection was made in an average of 1 hour and 46 minutes, in a series of 3 experiments, and the average dose was 1.15 mg. per Kg. when the average period of injection was 3 hours and 17 minutes in another series of 3 experiments. While this indicates that the active substance contains a small percentage of the rapidly eliminated principles, the difference is within the limits of error. In fact, it seems probable that small amounts of the rapidly eliminated genins are present, and since Weiss and Hatcher found little else in the second chloroformic extract of their evaporated aqueous residue, it seems certain that the second chloroformic extract of digisol would contain them if the method used permitted of their extraction. It is possible that Sluyters did actually extract these genins, but they add nothing of value to the preparation and it is better without them.

One gram of digitalis of good quality, of which about 100 mg. equals 1 cat unit, usually yields about 2.75 mg. of purified residue, equal to 2.2 cat units, hence, the purified residue represents about 22 per cent of the total activity of the leaf. When injected intravenously into cats, it is nearly as active as Kraft's gitalin, about half as active as crystalline gitalin, and about one-fourth as active as Merck's crystalline digitoxin.

It gives the Keller reaction, a blue layer at the point of contact, the acetic solution gradually becoming blue-green when a little of the purified residue is dissolved in glacial acetic acid, a trace of ferric chloride is added and the solution is allowed to overlie sulphuric acid or Kiliani's reagent without mixing,[1] it also gives a red ring at the zone of contact of the acids. The color test is of little significance, however, since the blue-green is due to digitoxose, according to Cloetta, and is given by gitalin, bigitalin or digitoxin, while the red ring is given by free genins. The purified residue of digisol with Kiliani's reagent gives a cherry-red color.

[1] Kiliani's reagent consists of 0.05 Gm. ferrous sulphate, dissolved in 1 cc. of water and added to 100 cc. of pure sulphuric acid.

From this brief discussion and all the facts available, we may say that the purified chloroformic residue consists mainly of gitalin with small amounts of bigitalin, digitoxin and free genins of the gitalin group, together with impurities, including a trace of saponin and substances of unknown character which serve to render the active principles soluble in water and in dilute alcohol. It is related to the digitalein of commerce but that substance is so variable that it has ceased to have a definite meaning. True digitalin, the digitalinum verum of Kiliani, whatever it may be, differs widely from digitoxin and it almost certainly plays no essential rôle in the action of digitalis, and this is true in an even greater degree of the so-called German digitalin, hence they require no further consideration here.

The active substance of digisol is identical with a chloroformic residue prepared by Weiss and Hatcher in 1921, to which reference has already been made. They did not seek to introduce it because they were not convinced that it is superior to ouabain for intravenous injection or to a good specimen of tincture of digitalis for oral administration, and, on the other hand, it is more expensive than tincture of digitalis. Digisol or the purified chloroformic residue differs from the official infusion and tincture of digitalis, both of which represent practically all the activity of the leaf, despite the statement of numerous investigators that digitoxin is insoluble in water. Since it represents only about 20 per cent of the total activity of the leaf, it does not contain all of the gitalin and bigitalin or else we must suppose that digitalis contains other active substances in addition to the digitoxin, gitalin and bigitalin mentioned by Cloetta. The unpurified residue is probably as nearly pure as any active principle from digitalis can be, while retaining a sufficient degree of solubility in water or in normal salt solution to permit of its convenient use for intramuscular injection. The purified residue may be used for oral administration for which purpose it may be dissolved in a small amount of alcohol and diluted with water.

The solubilities of each of the active principles of digitalis are influenced by the presence of the other active substances, and, more especially, by impurities of unknown composition, and the intensity of the effect varies with the relative amounts, hence there is almost no limit to the number of impure substances of different solubilities that may be prepared from digitalis.

g. Stability of Digisol and of the Purified Residue.—The stability of various preparations of digitalis has been the subject of as much dispute as various other problems concerned with this drug. It has been stated that infusion of digitalis decomposes with such rapidity that it is of little value after a single day. On the other hand, Hatcher and Eggleston (12) found that infusion of digitalis decomposes very slowly. Various investigators have reported the rapid or slow deterioration of tinctures of digitalis, but one of us has maintained that almost every tincture of digitalis prepared with a high percentage of alcohol keeps almost indefinitely, though he has seen one specimen of the tincture prepared by himself lose half of its activity within a year.[1] There is also a wide diversity of opinion concerning the readiness with which various digitalis principles and preparations are destroyed in the gastro-intestinal tract. We have therefore conducted ex-

[1] Work now in progress in this laboratory, indicates that sterile infusions of digitalis and tinctures undergo slow deterioration during many years.

periments to show (1) the stability of digisol in vitro and (2) that of the purified residue in diluted hydrochloric acid.

(*1*) *Stability of Digisol Kept in Glass.*—A specimen of digisol made according to the directions of the Netherlands Pharmacopœia on September 4, 1928, except that it was somewhat more dilute than directed, after sterilization was placed in nearly filled bottles each holding 60 cc., these were sealed hermetically and kept in the laboratory during a period of six months, after which the activity was tested on cats in the usual manner. This solution, when tested on September 17, 1928, required an average of 5.26 cc. per cat unit in an average of 2 hours and 32 minutes. When tested on March 8, 1929, it required an average of 5.98 cc. in an average of 2 hours and 45 minutes. Hence, the activity after an interval of 6 months was 88 per cent of that found shortly after its preparation. This is within the limits of possible error and one cannot be absolutely certain that the specimen had undergone any deterioration. In the absence of further evidence, it would seem that digisol should not be kept more than one year.

(*2*) *Stability of the Purified Residue in 0.2 Per Cent Hydrochloric Acid.*—Cloetta states that crystalline gitalin is decomposed readily by dilute hydrochloric acid in the cold, with the liberation of gitaligenin which has a much weaker action than gitalin, whereas bigitalin is very much more stable and requires heat or a much stronger concentration of hydrochloric acid for its rapid decomposition.

Thirty milligrams of a specimen of purified chloroformic residue was dissolved in a few drops of alcohol and to this was added 45 cc. of 0.2 per cent of hydrochloric acid in which it was not perfectly soluble, though no actual precipitate formed. The solution was maintained at a temperature of 37° during two hours, after which about 10 cc. of alcohol was added and the acid was neutralized by the addition of 29 cc. of $N/10$ sodium hydrate, forming an almost perfectly clear solution. Enough water was added with sodium chloride to make the total measure 375 cc. of 0.85 per cent sodium chloride solution with about 3 per cent of alcohol. The solution would have contained one part of residue, had none been destroyed, in 12,500 of solution. This was then tested on 3 cats in the usual manner.

The activity of this specimen of purified residue, when diluted with 12,500 parts of 3 per cent alcohol in normal salt solution was such that 1.33 mg. equalled 1 cat unit. The test indicated that more than half of the active substance had been destroyed by the hydrochloric acid. One cat unit then corresponded to the undecomposed portion of 2.84 mg., that is, the average dose required was 35.5 cc. of the solution per Kg. of weight. Treatment with weak hydrochloric acid liberates genins of low activity, but we made no effort to separate these from the solution.

It is probable that no specimen of digisol administered orally to man would ever be in contact with 0.2 per cent of free hydrochloric acid during two hours. Nevertheless, the results of this experiment, which are in harmony with the statement of Cloetta, indicate that if digisol or the purified chloroformic residue is administered orally, it should be given while the patient is fasting.

This experiment also affords additional evidence that digisol and the purified chloroformic residue owe their activity mainly to gitalin, since bigitalin is not decomposed readily by such dilute hydrochloric acid without heat, and there is other evidence that they contain little digitoxin.

(*To be continued*)

A PRACTICAL, ACCURATE AND INEXPENSIVE APPARATUS FOR HYDROGEN-ION DETERMINATIONS.*

BY H. K. MULFORD AND F. R. GREENBAUM.

Within the last few years potentiometric hydrogen-ion measurements have been so simplified as to be practical for many industrial uses. More and more the importance of the hydrogen ion is realized, particularly in the fields of pharmaceutical, biological and medicinal preparations. It is desirable to obtain pharmaceuticals, medicinal preparations and biologics at neutral or as nearly neutral as is possible. The colorimetric method, because of its simplicity and the general impression that elaborate and expensive purification of chemicals and complicated calculations are required for the potentiometric method, is still used by many laboratories. It is now possible for an average operator to read over a set of directions, make up a calomel cell from commercially purified chemicals and determine a hydrogen-ion measurement to a high degree of precision in a remarkably short time.

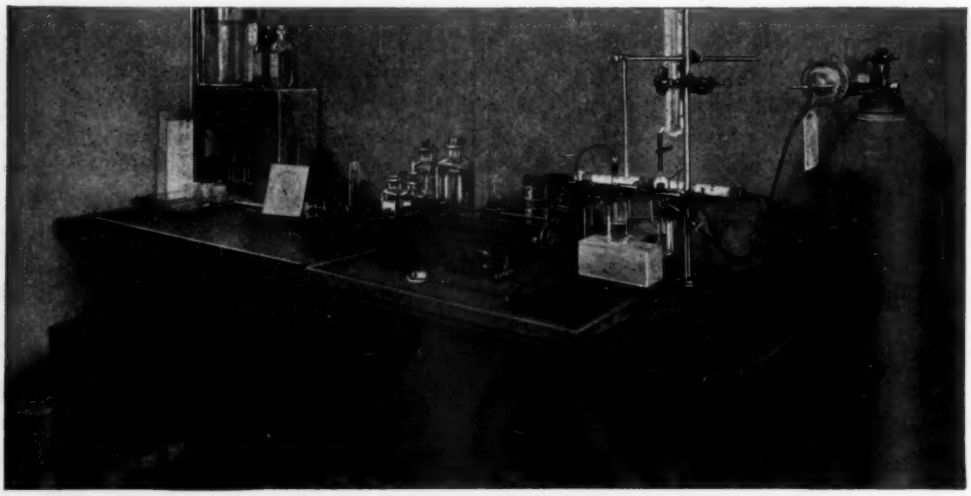

Fig. 1.—Potentiometer for hydrogen-ion determinations.

The apparatus we are using, is comparatively inexpensive, is accurate in its readings and is well suited for research and clinical laboratories and physicians.

Pharmaceutical, medicinal and biological preparations often have a p_H outside the quinhydrone range, particularly above 9, at which range the quinhydrone system is unreliable. Solutions having a p_H of 10 or above 10 are best measured with the hydrogen electrode.

In order to decrease the expense of the hydrogen-electrode apparatus, we have made a hydrogen-ion apparatus,[1] which has been found to be very satisfactory and obtains readings accurate to 0.01. Of the many potentiometric arrangements we use the Hildebrand apparatus, as it appears to be a simple method and at the same time quite accurate.

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* Scientific Section, A. PH. A., Portland meeting, 1928.

[1] We have used part of the setting up as suggested by Dr. Gordon Saxon.

The following diagram shows the Hildebrand arrangement: Hildebrand uses an immersion electrode, the successful operation of which depends upon a vigorous stream of hydrogen from the hydrogen tank, bubbling through the solution about the electrode. In the Hildebrand arrangement the hydrogen electrode and the calomel electrode are used as indicated in the diagram. The hydrogen electrode has the advantage of being used, where colorimetric tests fail or are entirely impossible, and it can be connected with an automatically recording electrical apparatus as supplied by Leeds & Northrup Co., of Philadelphia.

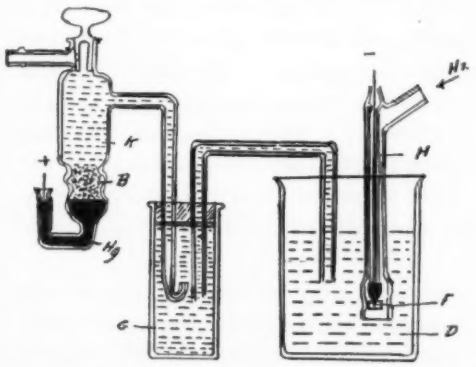

Fig. 2.—Liquid junction potentials—"salt bridge." *Hg*—Mercury (especially prepared). *B*—Calomel. *K*—Saturated KCl. *G*—Connecting vessel. *D*—Liquid of unknown p_H value. *H*—Hydrogen electrode. *F*—Platinum contact.

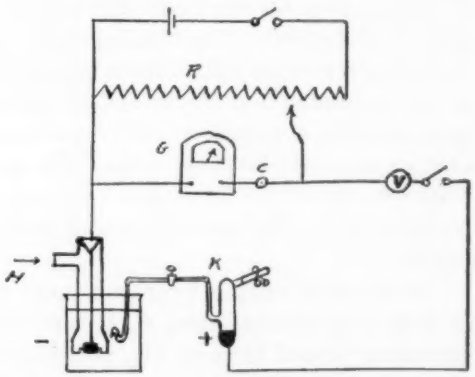

Fig. 3.—Diagram of the Hildebrand apparatus. *R*—Rheostat. *G*—Portable galvanometer. *V*—Voltmeter. *H*—Hydrogen electrode. *K*—Calomel electrode containing sat. KCl. *C*—Contact button.

In order to connect this Hildebrand apparatus we purchased the following articles: one resistance coil, 2 dry cells, 1 voltmeter, 1 galvanometer, 1 hydrogen electrode, 1 calomel electrode, 1 hydrogen tank, one hydrogen-reduction valve, 2 knife switches, 1 bell button and wire. We then mounted the resistance coil, the galvanometer, the voltmeter, with the knife switches and the bell button on a bakelite board, in the arrangement as shown by the above diagram, and connected the positive terminal with the hydrogen electrode and the negative pole with the calomel electrode.

For the preparation of the calomel electrode it was necessary to secure specially prepared mercury, specially prepared calomel and a saturated solution of C. P. potassium chloride. Mercury is added to the cell, until the tip of the platinum wire is well covered. About 7 Gm. of calomel is added and the cell is filled with a saturated solution of potassium chloride, shaken for several minutes and connected with a supply vessel, containing saturated potassium chloride. The pinch clamp of the supply vessel is loosened and the calomel electrode is flushed with saturated KCl, care being taken that no air bubble is formed; all air bubbles must be driven out. The cell is then ready for use. The cell should be flushed between every two or three measurements and also after the measurements are completed, in order to prevent contamination. The next diagram shows the hydrogen electrode and the calomel electrode with the connecting bridge. The hydrogen electrode (point type) must be freshly coated

with platinum before use. They are first cleaned with filter paper, electrolyzed in concentrated hydrochloric acid, washed in water, and dipped in a 3% platinum chloride solution. The current from a two dry-cell battery is allowed to flow through for 1 minute. The electrode is now coated with platinum black and is then electrolyzed in a 10% sulphuric acid, to give it a coating of hydrogen in status nascendi. The calomel electrode and the hydrogen electrode so prepared are now inserted into the liquid, the p_H of which is to be determined, and a vigorous current of hydrogen is passed through, at the rate of about 2–3 bubbles a second. The resistance plug on the resistance coil is moved until the galvanometer no longer shows a deflection. The reading on the voltmeter can now be taken and by means of the hydrogen-ion calculator is transformed into p_H reading. It is most desirable at the beginning and at the end of each series of determinations to check the apparatus with a standard buffer solution of known p_H value. In this way any defect can easily be determined; the main defect is usually the poisoning of the platinum tip of the hydrogen electrode. This apparatus will give accurate p_H readings up to the second decimal point and the cost involved will approximate $75.00.

Instead of using a hydrogen tank, the hydrogen may be prepared chemically in Kipp's apparatus, using C. P. zinc and sulphuric acid; the so-prepared hydrogen being passed through 3% potassium permanganate and through 10% sodium hydroxide solution and finally dried over calcium chloride before entering the hydrogen electrode.

We have determined the p_H of a large number of biological and pharmaceutical preparations and have obtained satisfactory results with this "home made" apparatus.

The following table gives an account of some of our results obtained:

TABLE SHOWING HYDROGEN-ION DETERMINATIONS CARRIED OUT WITH THE ABOVE DESCRIBED HILDEBRAND APPARATUS.

Name of preparation.	Lot no.	Preparation no.	Remarks.	p_H.
Sodium iodide and salicylate of soda with colchicine	8074	61	A sterile	8.20
Sodium salicylate	8076	162	A sterile	8.00
Sodium salicylate	8076	162	B non-sterile	7.35
Iron cacodylate	8075	110	B non-sterile	0.60
Sodium cacodylate	8071	13	A sterile	8.20
Liquor pituitary and epinephrine	8061	143	A sterile	1.95
Anterior pituitary	8046	152	A sterile	3.85
Sodium salicylate	8044	41	A sterile	7.60
Iron citrate compound	8045	7	A sterile	7.93
Sodium iodide	8052	65	A sterile	1.95
Sodium iodide	8052	65	A sterile	1.95
Sodium salicylate	8044	41	B non-sterile	7.20
Iron cacodylate	8055	92	A sterile	1.28
Iron cacodylate	8055	92	B non-sterile	1.74
Iron ammonium citrate comp.	8045	7	B non-sterile	below 0
Sodium citrate	8040	160	A sterile	14.00
Physiological salt solution	8041	100	A sterile	6.60
Physiological salt solution	8041	100	B non-sterile	7.25
Dextrose 50%	8042	175	A sterile	6.60
Dextrose 50%	8042	175	B non-sterile	6.90

Glycerophosphate comp.	8038	134	A sterile	6.85
Glycerophosphate comp.	8038	134	B non-sterile	7.00
Procaine solution	8039	104	A sterile	4.95
Procaine solution	8039	104	B non-sterile	6.45
Iron ammonium citrate	8035	88	A sterile	below 0
Iron ammonium citrate	8035	88	B non-sterile	below 0
Iron cacodylate	8036	54	A sterile	0.55
Iron cacodylate	8036	54	B non-sterile	0.25
Iron cacodylate	5000	54	A sterile	5.30
Iron cacodylate	5001	54	A sterile	1.60
Iron cacodylate	8028	54	A sterile	2.75
Iron cacodylate	8028	54	B non-sterile	1.95
Morphine sulphate	8023	114	A sterile	5.15
Sodium cacodylate	8020	12	A sterile	8.40
Sodium cacodylate	8020	12	B non-sterile	8.40
Sodium iodide and salicylates with colchicine	8019	103	A sterile	8.72
Sodium iodide and salicylates with colchicine	8019	103	B non-sterile	8.72
Glycerophosphates compound	8010	86	A sterile	6.70
Glycerophosphates compound	8010	86	B non-sterile	5.85
Iron cacodylate 2% solution	8018	54	A sterile	3.12
Iron cacodylate 2% solution	8018	54	B non-sterile	2.10
Mercurochrome 1% solution	6346	5	Old ampul	5.90
Mercurochrome 1% solution	6346	5	June 15, 1927	7.22
Mercurochrome 1% solution	6346	5	October 31, 1927	7.85
Mercurochrome 1% solution	6346	5	June 12, 1928	8.55
Procaine and epinephrine	8017	132	A sterile	2.55
Procaine and epinephrine	8017	132	B non-sterile	2.65
Magnesium sulphate	8004	25	A sterile	5.85
Magnesium sulphate	8004	25	B non-sterile	6.85

We have obtained, as can be seen from this table, accurate readings with this apparatus and have been able to cover the range from 0–14.

It is interesting to note the difference of the p_H in sterile and non-sterile preparations. Of course it depends on the chemical nature of the preparation as to how the sterilization will influence the p_H. In some cases the p_H will be slightly influenced by sterilization, such is the case in procaine and epinephrine solution, sodium cacodylate, sodium iodide and many others.

Other preparations, however, will change the p_H on the acid side by sterilization, such is the case in physiologic salt solution, dextrose, glycerophosphates compound, procaine, magnesium sulphate and many others and finally some preparations on sterilization show an increase in the p_H, which means they become less acid, as in iron cacodylate.

The hydrogen-electrode apparatus, however, is unsuitable for determining the hydrogen-ion concentration of solutions containing certain metals. Among these metals might be mentioned copper, arsenic, bismuth, antimony and mercury; of course gold and other noble metals will have the same action. The reason for these unsatisfactory results on some organic metal solutions is probably due to the reduction of the electrode by the metal ion—the metal ions below hydrogen in the electro-chemical series reducing the hydrogen electrode.

For measurements of this type of solution the quinhydrone electrode may be employed. In order to use our above-described apparatus it was only necessary to obtain one gold electrode and some quinhydrone, both rather inexpensive items.

Then by replacing the hydrogen electrode with the gold electrode and adding a small amount of quinhydrone to the metal organic solution the p_H can be readily determined with the same Hildebrand arrangement and in this way gives a combined hydrogen and quinhydrone apparatus.

From the foregoing we hope we have made it quite clear that at comparatively little expense an accurate hydrogen-ion apparatus may be built, entirely suitable for the needs of pharmaceutical, medicinal and biological chemists.

RESEARCH LABORATORIES,
THE NATIONAL DRUG CO., PHILADELPHIA, PA.

STUDIES IN BIOASSAYS—"THE TINCTURE OF STROPHANTHUS."*[1]

BY CHARLES W. EDMUNDS, M.D.,[2] HAROLD W. LOVELL[3] AND SPENCER BRADEN.[3]

The U. S. Pharmacopœia directs that Tincture of Strophanthus shall be of such a strength that 0.0006 cc. of the tincture shall be equivalent in strength to 0.0005 mg. of ouabain when tested upon frogs by the official method. Burn and Trevan have pointed out that this is equivalent to saying that 1 cc. of the tincture must equal in activity 8.33 mg. of ouabain. These workers assayed six tinctures of strophanthus by the cat method, and found all of them to be considerably weaker than the U. S. P. requirement, averaging an ouabain equivalent of about 3.5 mg. instead of 8.33 mg.

Other writers at an earlier date have reported upon the activity of tinctures of strophanthus as they appear upon the market, but some of these papers reported conditions existing in this country before a biological standard was required, or in other instances conditions existing in localities to-day where such standards are still not demanded. For this reason it will hardly be necessary to discuss their findings at length. The Burn-Trevan paper will be discussed later, as it is an important criticism of the U. S. P. standard, which perhaps should be lowered in the next revision, if it is, as stated, unreasonably high. It was in an effort to shed further light upon the question that we examined a number of tinctures of strophanthus which were obtained in original, unopened bottles direct from the manufacturers. We employed the same methods and standards which we had used in our study of ouabain and strophanthin as outlined in the section of this paper which appeared in an earlier number of THIS JOURNAL.

The bioassay methods employed were as follows: the various frog methods, including the official one-hour method; the intravenous method; the four-hour method and in one or two instances the minimal lethal dose method. We used also the cat-assay method and finally the colorimetric method. In addition to using ouabain as a standard we employed also a special tincture prepared from Strophanthus Kombé seeds which we obtained through the courtesy of Dr. Paul S. Pittenger. These seeds which were obtained direct from a "Kombé" district in Africa and identified as being of that variety, were ground and made into a tincture according

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* From the Pharmacological Laboratory of the University of Michigan.

[1] Supported in part by a grant from the Board of Trustees of the U. S. Pharmacopœia.

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to U. S. P. directions. It is designated in the table as "Mich." The results of our assays together with the calculated ouabain equivalents for each tincture are given in Table I.

TABLE I.—RESULTS OF ASSAYS OF VARIOUS TINCTURES OF STROPHANTHUS BY DIFFERENT BIOLOGICAL METHODS.

Tincture number.	Official method.	Ouabain equiv. in mg.	Intravenous method.	Ouabain equiv. in mg.	Four-hour method.	Ouabain equiv. in mg.	Cat method.	Ouabain equiv. in mg.	Colorimetric method.
Ouabain control	0.00050	...	0.00035	...	0.00040	...	0.103	...	...
XV[1]	0.105	4.76	0.06	5.8	0.065	6.16	0.025	4.12	4.33
XVI[1]	0.100	5.00	0.05	7.0	0.055	7.28	0.021	4.90	5.65
XVII	0.070	7.14	.....	...	0.050	8.00	0.019	5.42	6.85
XVIII	0.130	3.84	.....	...	0.100	4.00	0.042	2.45	3.80
XIX	0.100	5.00	.....	...	0.065	6.16	0.028	3.68	...
Mich.	0.070	7.14	0.04	8.75	0.050	8.00	0.020	5.00	...

[1] Specimens XV and XVI were made by the same manufacturer.

A study of this table makes at least one point clear; *viz.*, that in this country, too, some of the tinctures of strophanthus on the market are certainly below the U. S. P. standard. Only one of the commercial tinctures (XVII) approaches it and it may be said to meet the official requirements, as it is within 15% of the standard. The "Michigan" tincture prepared from the Kombé seeds was of identical strength with commercial Tincture XVII.

A study of the other results also shows certain relationships which seem to hold good, but the picture is so confusing as to make it almost impossible to draw any general conclusions. To aid such a study the results were all refigured to the same basis with Tincture XVII considered as 100%. The results given in Table II are most interesting.

TABLE II.

	Methods.			
Tincture.	Official.	Four-hour frog.	Cat.	Colorimetric.
XV	66	77	76	63
XVI	69	91	90	86
XVII	100	100	100	100
XVIII	54	50	45	56
XIX	69	77	68	..

It will be seen at once that by all the methods of assay, Tincture XVIII is 50% strength as compared with No. XVII, and that No. XIX is 70–75% as strong as No. XVII. Such a uniformity in assay results is very encouraging. Considering Nos. XV and XVI which were manufactured by the same firm, it is evident by all the methods that they are both below U. S. P. strength and that No. XV is distinctly weaker than No. XVI. However, by the four-hour frog and by the cat method the relationship to XVII is very different from what it is by the official method. The values obtained for each of these tinctures is practically the same by the two unofficial methods named and in each there is a much closer approach to No. XVII than in the official method. The results of the colorimetric method, erratic as usual, show an agreement of XV with the results from XV and XVI by the frog one-hour method and with XVI an agreement with the results obtained with the other two methods.

It is evident from these figures that for some reason the one-hour frog method did not evaluate the true strength of these two preparations (XV and XVI) although it did evaluate XVIII and XIX correctly where the agreement between the results obtained by all the methods are in close agreement. There was probably some variation in the process of manufacture of XV and XVI which made a difference in the product which interfered with its absorption from the frog's lymph sac. On the other hand, with the four-hour period of observation, absorption is complete and we have a close agreement with the results obtained by the cat method in which, of course, there is no problem of absorption. The remaining results obtained on the tinctures agree very closely in so far as the relative values of these five specimens is concerned.

A further study of Table I discloses the fact that the actual ouabain equivalents of the tinctures as calculated from figures obtained by the four-hour frog method are much higher than are those obtained by the cat method—the former figure being about 50% greater than the latter. The values obtained by the official method occupy an intermediate position. The figures given by the intravenous method are practically the same as those obtained by the four-hour method, demonstrating the completeness of absorption in the four-hour period. It is noteworthy that the average ouabain value obtained by the cat method is lower than that given by any other method—as is shown in Table III.

TABLE III.—AVERAGE OUABAIN EQUIVALENTS OBTAINED BY THE VARIOUS METHODS OF ASSAY FOR THE DIFFERENT TINCTURES OF STROPHANTHUS.

	Mg.
Cat method	4.26
One-hour frog method	5.15
Four-hour frog method	6.60

This relationship is shown still more clearly in the graph prepared from the figures of ouabain equivalents given in Table I. Several points in this graph should be noted. In the first place, the practical parallelism which exists between all the lines is especially striking. There is only one exception, *viz.*, in the one-hour frog dose of Tincture XVI. This dose is evidently too low, but with this value[1] corrected a complete parallelism would exist, demonstrating the accuracy of the methods and the correctness of the findings. What is hard to explain is that the cat method gives such low figures as compared with those obtained by the other methods. The values obtained by the four-hour and by the intravenous method agree closely. The actual figures shown in the graph are not so important as is the fact of the difference in ouabain values obtained by the different methods. That these are essentially correct is shown by the parallelism of the curves.

To return to the results obtained on Tinctures XV and XVI by the one-hour method, the values obtained were reported to the makers who reassayed both preparations and reported that they found them both to be of standard strength—*viz.*,

[1] An examination of Table I shows that a change in the one-hour frog dose on Tincture XVI, from 0.100 cc. to 0.090 cc., would give an ouabain value of 5.5 mg., thus making all the lines parallel. Examination of the experimental data shows that such a dose given in the assay killed 14 frogs out of 33, therefore less than 50% of those injected, while a dose 0.100 killed 23 out of 30, so that by only a very slight margin was it necessary to take the latter figure as the correct M. S. D. instead of 0.090 cc.

with an M. S. D. of 0.063 cc. with ouabain at 0.0005 mg. The discrepancy between the manufacturer's results and ours is probably to be explained by the fact that for assay purposes they diluted their tinctures with 50% alcohol and this with distilled water, so that the doses injected contained about 25% alcohol. In our assays we use no alcohol, diluting the tinctures with saline solution. This difference in technic will probably explain the discrepancy in the results, and it further emphasizes the great need for standardization of the assay methods themselves.

Again, our results showing that No. XVIII was about 50% under strength were also reported to the manufacturers of this preparation. It, in turn, was reassayed by two of their workers, one of whom reported it to be 40% U. S. P. and the other 53%. In this instance the manufacturer's figures agreed exactly with ours. They indicate a deterioration of 50% between February 1927, when the preparation was originally assayed by them, and May 1928, when these tests were made. The apparent great loss of strength in this tincture is important, as the tincture of strophanthus is generally believed to be a fairly permanent preparation. The tincture made locally was practically of the same strength as No. XVII —in other words, it was within 15% of standard strength.

Finally, the question naturally comes up as to whether the U. S. P. standard for the tincture of strophanthus is too high as claimed by Burn and Trevan. In this connection it is to be noted in their paper that, by the cat method of assay, they found a value for U. S. P. ouabain of only 0.06115 mg. per Kg., whereas (as judged by previous work) it should have been approximately 0.1 mg. per Kg. This latter value was originally found by Hatcher and Brody and it has been repeatedly confirmed since their figures appeared. In the present research our value for U. S. P. ouabain was 0.103 mg. per Kg. and the average of the six ouabains studied was 0.108 mg. The reason for the discrepancy between the Burn-Trevan figures and the Hatcher-Brody value is probably to be found in the fact that Burn took a different "end-point" in his experiments from that recommended by van Wijngaarden and by the Geneva Conference. Burn took the fall of blood pressure to zero as his end-point while the Hatcher-Magnus method directs stoppage of the heart as recognized by inspection and palpation of the thorax. This difference in technic may make quite a little difference in final readings as has been pointed out in the earlier section of this paper and as recognized by Trevan in his report and by Burn in his book on "Bioassays."

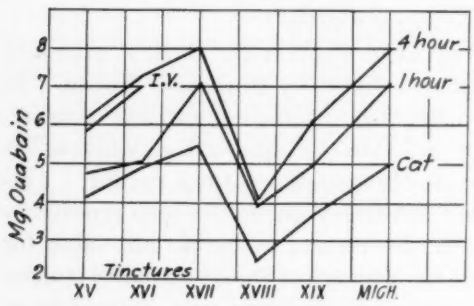
Much more important, however, in this connection is the fact that in their study of this problem and in the gaining of the data which formed the basis of their criticism, they did not employ the U. S. P. official method at all, but a lethal dose (eighteen-hour) method. In fact, in all of their experiments which were carried out in this particular research, so far as can be told by their papers, they did not use the U. S. P. method once, and yet from data so gained they draw conclusions as to the correctness of the U. S. P. standard. The U. S. P. standard holds good only so long as the methods of carrying out the test as outlined in the U. S. Pharmacopœia are followed. The M. L. D. obtained by an eighteen-hour period of observation is by no means the same as the M. S. D. found by a one-hour method.

In the next place the U. S. P. prescribes that a certain variety of frogs shall be used, *viz.*, *Rana pipiens*. Burn and Trevan used *Rana Temporaria*. What the relative degree of toxicity is upon the two species of frogs we do not know and until

we do and it can be shown that it is the same for both, the U. S. P. standard cannot be judged by results obtained on *Rana Temporaria*.

The U. S. P. standard strength of tincture of strophanthus, *viz.*, that 1 cc. equal 8.33 mg. ouabain, only holds for the one-hour frog (*Rana pipiens*) method. What the equivalent in terms of ouabain would be by a lethal dose method or by the cat method the Pharmacopœia does not state. That these figures differ widely is shown by the results given in Tables I and III and also in the curves here reproduced (Graph I). These curves representing the ouabain equivalents of six tinctures of strophanthus illustrate in a striking manner the difference in ouabain values of these tinctures when measured by different methods of assay. The explanation for these interesting differences is by no means clear, but the curves illustrate the impossibility of taking a standard obtained by one method and applying it to results obtained under other conditions and upon an entirely different variety of frogs.

The same error is made by Trevan, Boock, Burn and Gaddum in discussing the relative value of the international standard powder of digitalis to ouabain. They state that the tincture made from this powder is, for practical purposes, of U. S. P. standard strength inasmuch as 1 cc. of the international tincture is equivalent to 0.0804 mg. ouabain as compared to the U. S. P. standard of 0.083 mg. But here again figures obtained by two entirely different methods of assay are brought together and an effort made to compare them. The Trevan value of 0.0804 mg. was obtained by intravenous injection into cats; the U. S. P. equivalent of 0.083 mg. is to be obtained by the injection of the drug into the lymph sac of frogs—(*Rana pipiens*)—systolic standstill to occur in exactly one hour. The close values obtained prove nothing. In the paper above quoted it is also stated in this connection that the "evidence clearly demonstrates the unsuitability of ouabain as a standard for digitalis." In the light of what has been said above it will be seen that on the basis of the evidence presented this statement has no justification.



This graph shows ouabain values for six tinctures of strophanthus as obtained by four bioassay methods. Note the general parallelism of the lines and the different values given by the various methods.

It may be possible to work out a definite ratio or relationship so that when a standard dose is given for one method of assay the corresponding dose may be calculated for the other methods, but at present sufficient figures are hardly available, although the curves given above, if confirmed by others, are very suggestive.

Finally, it is a question deserving serious consideration as to whether the U. S. P. biological standard for tincture of strophanthus is not too high. The standard was set in the Ninth Revision which appeared in 1916 and there does not seem to have been any complaint made. When the Tenth Revision was under way and manufacturers were freely consulted, this point was never raised by them. In fact, none of the standards for the digitalis series were modified, which would

certainly have been done had experience with U. S. P. IX shown that it was desirable.

At first glance our figures would seem to justify and even to demand such a revision. However, a closer study does not make it seem quite so certain. For instance, Tincture XVII is practically of standard strength as was also the tincture made locally. Tincture XVIII is 50% strength, but the assayist (one of the most experienced in this country) reports that in February 1927, it was of standard strength.

One manufacturer when asked his opinion as to the standard said that while they have no trouble in meeting it, they feel that it is about the upper limit. They find many samples of drugs below standard, few above it. Another manufacturer reports that very few samples of Kombé seeds come up to the U. S. P. standard; that for two years it has been practically impossible to obtain strophanthus of more than 50% strength; and, in fact, in the past ten years they have received only one lot of seed of U. S. P. activity. A shipment of strophanthus seed recently received by them and carefully identified as being "Kombé" gave an activity of only 45% U. S. P. strength. The experience we had with the Kombé seeds is interesting in this connection.

In the light of these reports, it would seem that in the next pharmacopœial revision the standard for this tincture might well be taken under consideration and possibly a lower standard of strength be set. After all, strength of such a preparation is not so important as uniformity.

A PRELIMINARY REPORT ON THE CHEMISTRY OF PHYTOLACCA.*

BY GLENN L. JENKINS.†

Poke root was first officially recognized by the United States Pharmacopœia in the edition of 1820. It was retained in all subsequent revisions until the ninth when it was dropped and became official in the fourth edition of the National Formulary and was retained in the fifth edition, where it is defined as "the dried root of *Phytolacca Americana* Linné (*Fam. Phytolaccaceæ*)." It does not appear to have been included in any other pharmacopœia.

Tarwell[1] proposed that the proper designation of the source of poke root is *Phytolacca Americana* L. rather than *Phytolacca decandra* L. and this designation was adopted in the N. F. V. As is well known various popular names have been given to the plant.

Numerous claims of therapeutic action produced by the drug have been made. Hawkins and Sayre[2] mention the irritant action of the root on mucous surfaces, inhalation of the powder producing pain in the lungs for two weeks. Hammer[3] writes "Phytolacca has a wonderful action on the skin and usually relaxes it so that it is able to get rid of any irritable substance." It is also said to be useful in

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* Scientific Section, A. PH. A., Portland meeting, 1928.

† Professor of Pharmaceutical Chemistry, School of Pharmacy, University of Maryland.

[1] *Drug. Circ.*, 61 (1917), 23.

[2] *Ibid.*, 36 (1902), 244.

[3] *Med. World*, 33 (1915), 35.

sore throats characterized by enlargement of the cervical glands and tonsils.[1] Holmes[2] considers it a valued remedy in the treatment of cancer and ulcers. Brundage found it produced nausea, vomiting, slowing of the heart and respiration, depression dyspnea and palpitation.[3] Dispensatories and textbooks on Materia Medica refer to it as an emetic, purgative and slight narcotic. Cressler[4] records a case of poisoning accompanied by vomiting and purging in five persons, while milling the drug.

No complete chemical examination of Phytolacca has been reported in the literature. Pape[5] found gum, starch, tannin, fixed oil and an acid resin. Preston,[6] in addition to the above substances, reported the presence of lignin, sugar, a volatile acid characteristic of the root and traces of an alkaloid, to which the name phytolaccine was given. Burt and Nelson[7] failed to find alkaloid present.

The varied therapeutic properties attributed to poke root and the indefinite knowledge of its chemical constituents warrant a systematic study of its pharmacological action and chemistry.

EXPERIMENTAL.

For the purpose of this investigation a quantity of dried poke root in No. 20 powder was obtained from S. B. Penick and Sons, New York.

Moisture Determination.—Samples of the air-dried root when dried to constant weight in an electric oven at 100° C. lost 8.9 p. c. and 9.07 p. c. of its weight, respectively.

Ash Content.—Pape obtained 10.73 p. c., and Preston 8.4 p. c. of ash. Determinations carried out according to the U. S. P. X method yielded 9.45 p. c. and 9. 32 p. c., total ash of which 71.2 p. c. and 71.4 p. c., respectively, was acid-soluble. The ash was of a bluish green color. Qualitative analysis revealed the presence of potassium, sodium, calcium, iron, silicon, aluminum, magnesium and manganese combined as sulphate, chloride and phosphate.

Preliminary Extraction with Various Solvents.—In order to ascertain the general character of the constituents of the drug, 100 Gm. portions of the root in No. 20 powder were extracted in Soxhlet apparatus with each of the following solvents, and the resulting extracts were dried at 100° C. until of constant weight.

	P. c.
Petroleum ether (b. p. 40–52° C.) extracted	1.75
Ether extracted	1.45
Chloroform extracted	1.88
Alcohol extracted	14.55
Acetone extracted	3.65

The petroleum-ether extractive was of a greenish brown color, it formed a viscous oil when warmed and an unctuous semi-solid when cooled to 0° C., and possessed a characteristic pungent odor and taste; the ether, chloroform and acetone

[1] *Elect. Med. Jour.*, 75 (1915), 322.
[2] *Pharm. J.*, 105 (1920), 417.
[3] "Manual of Pharmacology," 4th Edition, 96 (1924).
[4] *A. J. P.* (1875), 196.
[5] *A. J. P.*, 53 (1881), 597.
[6] *Ibid.*, 56 (1884), 567.
[7] "Introduction to the Analysis of Drugs and Medicines" (1910), 220.

extractives were similar but less oily and more pungent. The alcoholic extractive was a reddish brown, sticky, somewhat resinous mass, containing a considerable amount of needle-shaped crystals. All of the extractives were treated with petroleum ether, the soluble portions were mixed and evaporated; this yielded 2.4 Gm. of fatty-like substance which was set aside for further study.

Test for Alkaloid.—As a preliminary test, 10 Gm. of powdered root was extracted with Prollius fluid, the resulting liquid evaporated, and the residue treated with 2 p. c. sulphuric acid solution. The filtered, aqueous liquid when tested for alkaloid with Mayer's reagent, phosphomolybdic acid and picric acid-test solutions gave positive results but all other alkaloidal reagents reacted negatively.

For the purpose of a more complete examination, 2 kilos of drug were thoroughly extracted by continuous percolation with alcohol. After removal of the greater portion of the alcohol, 382 Gm. of a thick reddish brown extract containing considerable crystalline matter remained. This extractive was divided into two equal portions, designated Part A and Part B, respectively.

Examination of Volatile Constituents.—Part A, 190 Gm., of this extractive was placed in a large flask, some water added, and steam passed through the mixture until the entire amount of volatile matter present had been removed. The distillate was neutral to litmus, and contained a small amount of essential oil. It was shaken out three times with ether, the ethereal liquid washed with distilled water, dried over anhydrous sodium sulphate, and the ether removed. The residue was a mobile amber-colored liquid which possessed the characteristic odor of the drug and a sharp pungent taste. The amount obtained was 0.8 Gm., corresponding to 0.08 p. c. of the weight of air-dried root. It was readily soluble in 70 p. c. alcohol. The amount of this essential oil was too small to permit of further investigation.

After removal of the volatile constituents as above described, the contents of the distilling flask consisted of a reddish brown, aqueous liquid and a small cake of black resinous matter, which had separated to the bottom. The resinous matter was collected on a filter and reserved for further study. The filtrate was acidulated with sulphuric acid and again steam distilled. Acetic and formic acid were found in the distillate.

Examination of the Alcoholic Extract, Part B.—Separation of Potassium Nitrate.—The remainder of the alcoholic extractive containing crystalline matter was filtered with the aid of a pump. When the crystalline residue was purified by recrystallization from hot 95 p. c. alcohol 4.2 Gm. of white needle-shaped crystals were obtained, corresponding to 0.21 p. c. of the weight of root used. The crystals upon analysis were found to be pure potassium nitrate.

Isolation of Alkaloid.—The filtrate obtained as above was made alkaline with 5 p. c. ammonia, diluted with 100 cc. of water and extracted with successive portions of chloroform-ether mixture until free of alkaloid, as shown by tests with Mayer's reagent. The combined chloroform-ether shakings were shaken out with 2 p. c. sulphuric acid solution, the combined acid extractions made alkaline with ammonia and shaken out with ether. The combined ethereal solutions were washed with a little saturated solution of sodium carbonate, dried over anhydrous sodium carbonate, and evaporated to dryness spontaneously. The residue, 1.6 Gm. corresponding to 0.16 p. c. of the weight of drug taken, was a

yellowish colored gummy varnish which gave all characteristic tests for alkaloids. Attempts to crystallize this substance in the form of sulphate, picrate, hydrochloride and gold chloride from various solvents have thus far yielded negative results. The study of the alkaloid-like substance is to be continued.

ANTISEPTIC ACTION OF U. S. P. AND N. F. OINTMENTS.

BY GEORGE F. REDDISH AND H. WALES.*

Eighteen ointments are described in the United States Pharmacopœia, tenth edition, and nineteen in the National Formulary, fifth edition. Thirteen of the U. S. P. and fourteen of the N. F. ointments are used for conditions in which an antiseptic[1] action is apparently demanded. A search of the literature revealed that only a very few had ever been examined for inhibitory action on the growth of organisms. Consequently, these ointments were tested in the laboratories of the Food, Drug and Insecticide Administration to determine their antiseptic power.

Fig. 1.—Serum-agar plate containing *Staph. aureus* and streaked with six U. S. P. ointments. Antiseptic action is shown by Nos. 3 (*Unguentum Ammoniati*), 4 (*Unguentum Hydrargyri Mite*), 5 (*Unguentum Hydrargyri Oxidi Flav.*) and 6 (*Unguentum Iodi*). Antiseptic action is not shown by Nos. 1 (*Unguentum Acidi Borici*) and 2 (*Unguentum Crysarobini*).

PROCEDURE.

Samples of ointments of known purity and strength were prepared, and their efficiency was determined by the method described by Reddish.[3] In this test *Staph. aureus* is added to 1.5 per cent nutrient agar (p_H 7.2–7.4) containing 10 per cent of horse serum and also to plain nutrient agar without serum. After these have hardened in petri dishes the ointments, previously melted, are streaked on the surfaces of the agar with a glass rod and the plates are incubated at 37° C. for 24 hours. If the ointment is antiseptic a clear zone in which no colonies have grown surrounds the streaks. If the preparation has no antiseptic ingredients or if the active ingredients cannot leave the base and permeate the agar medium, colonies of the test organism grow in close proximity to and even under the streaks of ointment (Fig. 1). Whether the bacteria in this clear zone are killed or their

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[1] The term "antiseptic," as used in this paper, means a substance which, when applied to microörganisms, renders them innocuous, either by actually killing them or by preventing their growth, according to the character of the preparation or the method of application.[2]

[2] Reddish, JOUR. A. PH. A., 16 (1927), 501.

[3] Reddish, *Ibid.*, 16 (1927), 652.

growth merely inhibited is not shown by this test. If such information is desired, however, simple transfer of small pieces of agar from the clear area to tubes of broth may be made. The method is used primarily as a test of bacteriostatic property. As ointments remain in contact with infective organisms for a long period of time when used in practice, they will be effective as antiseptic agents if they inhibit growth and will render the infective organisms innocuous.

The clear zone surrounding the streak of ointment, besides showing antiseptic properties, also measures to some degree the activity of the ointment. Zeigler's[1] study of the absorption and antiseptic properties of iodine ointments indicates that there is a definite correlation between the results obtained by such tests and the absorption through the skin. Iodine ointment (U. S. P.) gives a wide clear zone by the serum-agar plate test, and, as Zeigler has shown, the iodine from this ointment readily penetrates the skin. On the other hand, stainless iodine ointment (N. F.) does not give a clear zone of inhibition on serum-agar and under the conditions of the test the iodine is not absorbed by the skin.

RESULTS.

Only five of the twelve U. S. P. ointments tested (Table I) showed antiseptic properties. These were active in both plain and serum agar. The results obtained with **Unguentum Hydrargyri Mite** indicate that **Unguentum Hydrargyra Fortior** would also be antiseptic. Six of the fourteen N. F. ointments tested (Table II) were antiseptic in plain agar, while only four were active in the presence of serum. The result obtained with phenol ointment U. S. P. X, which did not show antiseptic properties by this test, was contrary to the usual belief.

TABLE I.

ANTISEPTIC ACTION OF U. S. P. OINTMENTS.[1]

Ointment.	Width of zone of inhibition. Serum agar, *cm.*	Plain agar, *cm.*
Ung. Acid. Bor.	none	none
Ung. Chrysarob.	none	none
Ung. Hydrarg. Ammon.	0.2	0.5
Ung. Hydrarg. Mite	0.4	0.7
Ung. Hydrarg. Oxid. Flav.	0.15	0.4
Ung. Iodi	0.5[2]	0.8
Ung. Iodof.	none	none
Ung. Phenol.	none	none
Ung. Pic. Pin.	0.15	0.3
Ung. Plumb. Ol.	none	none
Ung. Sulphur.	none	none
Ung. Zinc. Oxid.	none	none

[1] Media—10 per cent serum agar and plain agar. Test organism—*Staph. aureus.*

[2] In Fig. 1 this zone appears very much larger because the small scattered colonies which surround the clear zone do not show in the photograph.

TABLE II.

ANTISEPTIC ACTION OF N. F. OINTMENTS.[1]

Ointment.	Width of zone of inhibition. Serum agar, *cm.*	Plain agar, *cm.*
Ung. Bitum. Sulphon.	none	none
Ung. Calamin.	slight	0.2
Ung. Camph.	none	none
Ung. Hydrarg. Chlor. Mit.	slight	0.15
Ung. Hydrarg. Nit.	0.8	1.3
Ung. Hydrarg. Oxid. Rub.	0.15	0.4
Ung. Iod. Denig.	none	slight
Ung. Pic. Co.	none	none
Ung. Plumb. Iod.	none	none
Ung. Pot. Iod.	none	none
Ung. Resorcin. Co.	none	none
Ung. Sulphur. Alk.	none	slight
Ung. Sulphur. Co.	none	none
Ung. Zinci Stear.	none	none

[1] Media—10 per cent serum agar and plain agar.

Test organism—*Staph. aureus.*

[1] Zeigler, JOUR. A. PH. A., 17 (1928), 648.

The influence of the base is demonstrated by the tests on zinc ointment U. S. P. and calamine ointment N. F. The calamine ointment, which contains about 17 per cent of zinc oxide in an ointment (chiefly lard) base, is antiseptic, while the zinc ointment, containing 20 per cent of zinc oxide in a paraffin-petrolatum base, shows no inhibitory action. These results show that, owing to the influence exerted by the base, it is impossible to predict the antiseptic value of a product from the antiseptic value of its constituents.

SUMMARY.

Only six of twelve U. S. P. X and four of fourteen N. F. V ointments were found to have antiseptic action under the conditions of the tests conducted on them. Furthermore, it was shown that the antiseptic action of such a preparation cannot be predicted from the action of its constituents.

A SIMPLE METHOD TO DETERMINE THE TOTAL VOLUME OF URINE VOIDED IN TWENTY-FOUR HOURS FROM A FRACTIONAL SPECIMEN.

BY HENRY J. GOECKEL.*

No doubt many clinical analysts are occasionally confronted with the same problem as the writer has been from time to time, namely, of receiving fractional parts of a twenty-four-hour specimen of urine to be analysed for the total quantity of some substance eliminated in the twenty-four-hour period, and the person submitting the same has failed either to carefully measure the total volume or has failed to note it down and has forgotten what the quantity was. It may be of interest to learn of the technic evolved and employed by the writer to determine the probable total volume.

When for dietary or other control it is important to know the total volume or the total quantity of sugar, urea, chlorides, etc., this enables you to save time, salvage the labor and to furnish the desired information with a fair degree of accuracy.

TECHNIC OF METHOD.

Several specimens of urine which by examination have been found to be practically normal are mixed together. The specific gravity and the urea content are again determined on this mixed specimen to be sure they are normal. The figures taken as normal are about 1.020 for the specific gravity and two per cent for the urea which figures hold for the section in which these tests are made by the writer under average temperature and humidity. When environmental conditions vary from this average the correct average volume, specific gravity and urea content is readily noted by observing these factors on the specimens received.

A measured volume of this mixed urine, namely, one hundred cubic centimeters is taken and compared colorimetrically with the urine of which the total volume is to be determined. They are compared in matched test-tubes or cylinders of equal diameter and equal thickness of the glass. Messlerizing tubes can be used for this purpose if at hand.

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* Cranford, N. J.

If the standard is found to be the darker it is diluted with distilled water until the two specimens match in color. The volume of the diluted urine is then carefully measured to find out how many cubic centimeters of water were added to the one hundred cubic centimeters of the standard. This number is then multiplied by twelve and the product is added to 1200 which will give the probable volume in cubic centimeters for the total twenty-four-hour specimen.

The figure 1200 cc. is taken as the average normal volume. The figure twelve (1200 divided by 100 cc.) is used to determine the volume of water that it would be necessary to add to the 1200 cc. of the standard to make it of the same volume as the urine being tested.

Example.—Diluted matched 100 cc. of the standard measured 122 cc.; then 22 cc. of water was required for the diluting and 22 × 12 gives 264 cc. for the total 24-hour standard. 1200 cc. plus 264 cc. gives 1464 cc. as the probably total volume for the specimen under examination.

When conditions are not average, or differ for the section of the country in which the examination is made, the normal volume and the fractional part factor will differ from 1200 cc. and for twelve and can be readily substituted for these.

This is especially serviceable for urine from diabetic patients. In these the total twenty-four-hour pigments are normal, the pale color of the urine is due to the excessive volume dilution.

Should the tested specimen be found to be darker than the standard, it is diluted in the same way until it matches the standard in color. The number of cubic centimeters of water required is determined in the same manner as above but the method of then determining the twenty-four-hour figure is not quite as simple as when the specimen under examination is more dilute than the standard. If 22 cc. of water were required to dilute the 100 cc. of the specimen under examination then the figuring is 100 plus 22 cc. or 122 cc., or the 100 cc. of urine tested is equivalent to 122 cc. of standard. Then the formula is $100/y{:}100 :: x{:}1200$ y = 100 plus cc. water added, or $100/122{:}100 :: x : 1200$ or x equals 983.6 cc. which is the twenty-four-hour total volume for this specimen.

Any standard type of a colorimeter can be used for matching the colors if one is available and the analyst is familiar with the technic for the given instrument.

A TIME-SAVING METHOD FOR USING THE DOREMUS UREA-NITROGEN DETERMINATION APPARATUS.*

BY LEAH G. GOECKEL.[1]

In a busy laboratory service where many specimens of urine are subjected to complete clinical urine analysis the newer side arm ureameter (Nitrometer) is not entirely satisfactory if the side arm burette is used for measuring the urine to be run into the hypobromite solution within the ureameter column proper. The preparation of the apparatus is too wasteful in time. For this reason we have preferred to employ the old style apparatus by which the one cubic centimeter of urine is run into the hypobromite by means of a curved tipped pipette.

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* Scientific Section, A. PH. A., Portland meeting, 1928.

[1] Cranford, New Jersey.

This method also has its disadvantages in that care must be taken in tilting the apparatus while running in the urine, or either loss of gas will take place or air will pass into the nitrogen column, thereby spoiling the determination.

Most supply houses are discontinuing to stock the old style apparatus. Our reserve supply of this type having recently become depleted and being obliged to use the newer style apparatus we have employed this in a manner superior to the usual technique advocated for either type.

Instead of pouring the urine to be analysed into the side burette up to the one or to the zero mark and measuring it by aid of the graduations thereon we use the 1-cc. pipette furnished with the old style apparatus and place exactly 1 cc. of urine into the burette arm and then by careful opening and closing the glass stopcock run the urine into the hypobromite solution. A few drops of distilled water are then run into the burette to wash down residual urine which is also run into the hypobromite column. The apparatus is then ready to receive the next lot to be analysed without the necessity of removing the hypobromite and residual urine to wash out the burette. In this way the same hypobromite reagent can be employed until spent, thereby saving material as well as much time.

Any 1-cc. pipette can be employed for this purpose. Placing an aspirating nipple at the further end makes it unnecessary to resort to mouth aspiration and is much more convenient and rapid. Employing the Doremus Ureameter in this manner will enable the supply houses to furnish the apparatus without the side-arm burette graduation, thereby reducing the production costs for the apparatus.

STUDIES ON THE DETERMINATION OF CAMPHOR IN CAMPHOR LINIMENT.

I. U. S. P. X METHOD.*

BY CHARLES F. POE, GOLDNER LIPSEY AND CLARENCE L. VAUGHN.

INTRODUCTION.

In comparing results obtained from the determination of camphor in camphor liniment by means of the method given in the present Pharmacopœia with the method previously used, it was found that the U. S. P. method gives much lower results. For instance, on samples containing 20.00 per cent camphor the differences were: —0.44%; —0.26%; —0.27%; —0.91% and —1.05%.

In searching the literature very little could be found concerning the evaporation method for the determination of camphor in camphor liniment. Kebler and collaborators,[1] in 1917, reported that the results by the evaporation method may be high, due to the liniment containing volatile materials other than camphor. In eleven out of fourteen analyses reported, the amounts of camphor obtained by this method were higher than the results obtained by using the polariscope. The differences were from +0.04% to +0.80%.

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* Presented before the Scientific Section, A. PH. A., Philadelphia meeting, 1926. Recently submitted.

[1] Kebler and collaborators, "Camphor Liniment," JOUR. A. PH. A., 6 (1917), 617.

Miller,[1] in 1917, reported that if the heating were conducted at 110° C. instead of 150° C., no decomposition of the oil took place.

Cook,[2] in 1906, reported that all of the camphor, except one-half per cent, was driven off at 100° C. when heated two and one-half hours.

Cowie and Dickson,[3] in 1906, found that when olive oil was heated, there was a change in the weight of the oil averaging 0.162 per cent.

Wallace and Plummer,[4] in 1921, worked on the changes in oils when heated. They determined the changes in specific gravity, refractive index, weight, iodine number and saponification number. In order to correct for the change in weight, when camphor liniments made from different oils were heated, they recommended that the following percentages should be added: cottonseed oil, 0.35%; peanut oil, 0.26% and olive oil, 0.27%. These authors also found that a sample of camphor liniment, made from cottonseed oil, when heated for five hours showed a loss in weight equivalent to 99.97% camphor. When other oils were used, the loss of camphor was almost quantitative when heated four hours. The results were as follows: peanut oil, 100.33%; olive oil, 99.88%; sesame oil, 100.07%. For camphor liniment, made with cottonseed oil, they recommend heating at 120° C. for five hours.

Since the methods given in the U. S. P. are used by food and drug officials for checking the purity of products sold to the public, it is essential that the methods give accurate results. Any method which will give low results is extremely objectionable, because the manufacturer should always be given the benefit of the doubt. Samples which are really up to standard may be condemned as being low in camphor when the method given in the U. S. P. is used. Since the method given in the U. S. P. X for the determination of camphor in camphor liniments seems to give consistently low results, it was decided to conduct a critical study of the method.

CHEMICALS AND METHODS.

The samples of camphor used were lots which had been saved at different intervals during the last twelve years. They apparently represented samples of camphor from widely different sources. The camphor was resublimed at least once, and in some cases twice. Any drops coming over at the beginning of the process, which did not solidify, were discarded. The purity was tested by determining the specific rotation in 95% alcohol. The samples of oil were obtained on the open market. These were tested for the usual oil constants: refractive index, specific gravity, iodine number and saponification number. Any sample which did not meet the U. S. P. standard was rejected. Samples of camphor liniment were made from the above constituents. The camphor was accurately weighed to the fourth decimal place in a tared glass-stoppered flask and the required amount of oil was added. This was weighed to the third decimal place. The camphor was allowed to dissolve either at room temperature or at a slightly higher temperature. Care was taken,

[1] Miller, "Note on Determination of Camphor," JOUR. A. PH. A., 6 (1917), 683.

[2] Cook, "Camphor Liniment. Assay by Evaporation," PROC. A. PH. A., 54 (1906), 637.

[3] Cowie and Dickson, "Linimentum Camphoræ B. P. Method of Assay," PROC. A. PH. A., 54 (1906), 638. *Pharm. J. & Pharm.* (1906), 281.

[4] Wallace and Plummer, "Determination of Camphor in Camphorated Oils," *A. J. P.*, 93 (1921), 600.

however, that the ground glass stopper was not removed during the time the camphor was going into solution. The accuracy of the preparation of each sample was checked by reading the sample in the polariscope.

The method of analysis was the official method given in the U. S. P. X. The procedure follows:

> "Place 5 cc. of camphor liniment in a tared porcelain dish, having a diameter of about 75 mm., weigh accurately, heat at about 110° C. for ninety minutes, or until the odor of camphor is no longer discernible, cool and weigh."

The ovens used for the determinations of the camphor were the Freas and DeKhotinsky constant-temperature ovens. These were set at 110° C. and maintained at this temperature during the heating process. Two other methods of heating were also used: the water-bath and hot-plate. It was thought that the water-bath could be used and the oxidation might be reduced, owing to the lower temperature (94.6° C.). Some slight variations of the above methods were made in certain cases. These will be mentioned at the proper place.

EXPERIMENTAL.

A series of samples was made up with varying amounts of camphor from 2.5% to 25%. Five grams of each of the samples were weighed into flat-bottom milk dishes made of aluminum. These were heated according to the U. S. P. method with results as listed in Table I. The time of heating was three hours.

TABLE I.

Per cent camphor in sample.	Loss in weight in Gm.	Per cent camphor found.	Per cent difference.
2.5	0.0869	1.74	−0.76
5.0	0.2030	4.06	−0.94
7.5	0.3552	7.10	−0.40
10.0	0.4776	9.55	−0.45
12.5	0.5824	11.65	−0.85
15.0	0.6749	13.50	−1.50
17.5	0.8280	16.36	−0.94
20.0	0.9376	18.75	−1.25
22.5	1.0796	21.59	−0.91
25.0	1.1997	23.99	−1.01

As may be seen from the above table, the error was considerable: the greatest, —1.50% and the least, —0.40%. These differences appeared even though the same lots of cottonseed oil and camphor were used in making up the different

TABLE II.

Per cent camphor in sample.	Per cent camphor found.					
	½ hour.	1 hour.	1½ hour.	2 hours.	3 hours.	5 hours.
5.0	1.70	3.26	4.25	4.46	4.52	4.38
7.5	2.61	5.70	6.82	7.25	7.00	6.33
10.0	4.54	7.89	9.28	9.63	9.60	9.28
12.5	6.61	10.48	11.45	11.94	11.96	11.76
15.0	7.30	13.22	14.12	14.48	14.31	14.22
17.5	11.47	15.32	16.64	17.38	16.56	16.48
20.0	15.22	17.33	19.05	19.52	19.28	18.61
25.0	15.14	19.42	21.24	22.27	22.03	21.55

members of this series. It would be expected that the error would be about the same in all the percentages, but there seems to be no consistency.

The effect of time of heating was tried on a series of liniments made from the same oil and camphor. These samples were heated in aluminum dishes in the constant temperature-oven for varying lengths of time up to five hours. The results are recorded in Table II.

In most cases the maximum amount of camphor was found in two hours. After this time the percentage began to decrease. There is probably a certain time in which the results would be at a maximum, but it would be impossible to find this time for every sample.

It was now decided to heat the sample of oil alone so as to determine the change of weight from this source. Five grams of oil were heated in an oven for the varying lengths of time as indicated in Table III.

TABLE III.

Time in minutes.	Increase in weight (Gm.).	Equivalent to camphor in per cent.
30	0.0060	−0.12
60	0.0172	−0.34
90	0.0385	−0.77
180	0.0419	−0.84
300	0.0464	−0.95

During the heating something happened to the oil which caused an increase in weight. As is well known, cottonseed oil contains an ester of oleic acid called olein. Oleic acid, Formula I, contains a double bond, and this double bond is very susceptible to oxidation, forming a substance having Formula 2.

1. $CH_3(CH_2)_7CH = CH(CH_2)_7COOH$
2. $CH_3(CH_2)_7CH—CH(CH_2)_7COOH$ (with O bridging the double bond)

It was thought that aluminum dishes might act as a catalytic agent and thus increase the rate of oxidation at the double bond. It was, therefore, decided to use porcelain and glass dishes as well as aluminum dishes. The results of these experiments, with the liniment, and oil alone, are recorded in Tables IV and V.

TABLE IV.

Per cent camphor in sample.	Kind of dish used.	Per cent camphor found.	Per cent difference.
20.00	Porcelain 75 mm.	19.28	−0.72
20.00	Porcelain 50 mm.	19.65	−0.35
20.00	Glass	19.53	−0.47
20.00	Aluminum	19.02	−0.98

TABLE V.

Sample oil used in Gm.	Kind of dish used.	Gain in weight in Gm.	Equivalent to camphor in per cent.
5	Porcelain 75 mm.	0.0226	−0.45
5	Porcelain 50 mm.	0.0136	−0.27
5	Glass	0.0358	−0.72
5	Aluminum	0.0475	−0.95

From Tables IV and V it will be seen that the error varied with the different kinds of dishes used. The greatest error was with the aluminum dish and the least with the 50-mm. porcelain dish. There also seemed to be considerable difference in the two porcelain dishes of different sizes. The error was nearly twice as great for the larger dish. This may have been due to the fact that there was a greater surface exposed to oxidation.

A number of examinations were next made using the three methods of heating, *i. e.*, the electric oven, hot-plate and water-bath. Samples were heated for three hours in each method. The results are listed in Table VI.

TABLE VI.

Dish used.	Per cent camphor in sample.	Per cent camphor found. Oven.	Hot plate.	Water-bath.
Aluminum	20.00	19.30	19.54	18.62
Porcelain		19.58	19.76	18.85
Glass		19.48	19.17	18.86
Aluminum	20.00	19.50	19.40	19.73
Porcelain		19.44	19.84	17.58
Glass		19.88	19.57	19.07
Aluminum	20.00	17.73	17.59	18.39
Porcelain		18.84	19.03	18.02
Glass		18.08	18.08	18.16

An examination of the above table plainly shows that none of the methods of heating are entirely satisfactory. The hot-plate method is unsatisfactory because

TABLE VII.

Dish used.[1]	Oil used.	Variation in per cent. 2 hours.	3 hours.	5 hours.
Q	2	−0.92	−0.24	−1.51
P		−0.56	−1.03	−1.55
A		−1.00	−1.83	−2.08
Q	3D	−0.44	−0.40	−0.70
P		−0.46	−0.45	−0.67
A		−0.47	−0.63	−1.04
Q	2A	−1.44	−0.73	−1.13
P		−1.09	−0.80	−1.04
A		−2.00	−1.34	−1.96
Q	3B	+0.10	+0.17	+0.03
P		+0.09	+0.18	+0.06
A		−0.23	−0.03	−0.19
Q	3C	−0.54	−0.45	−0.54
P		−0.59	−0.50	−0.48
A		−0.63	−0.53	−0.73
Q	1	−0.47	−0.56	−0.73
P		−0.59	−0.60	−0.74
A		−1.05	−0.85	−0.93
Q	4	−0.80	−0.32	−0.46
P		−0.85	−0.38	−0.47
A		−1.13	−0.48	−0.88
Q	5	−0.55	−0.46	−0.64
P		−0.56	−0.45	−0.84
A		−0.61	−0.41	−1.17

[1]Abbreviations: Q—quartz, P—porcelain, A—aluminum.

TABLE VIII.

Dish used.[1]	Oil used.	Per cent gain. 2 hours.	3 hours.	5 hours.
Q	2	0.33	0.81	1.04
P		0.25	0.52	0.84
A		0.58	1.06	1.15
Q	3D	0.18	0.33	
P		0.03	0.11	
A		0.69	1.45	
Q	2A	1.34	1.17	
P		1.14	0.95	
A		1.65	1.38	
Q	3C	0.20	0.70	
P		0.33	0.68	
A		0.55	1.09	
Q	1	0.16	0.22	0.55
P		0.12	0.17	0.65
A		0.12	0.24	0.90
Q	4	0.46	0.94	
P		0.28	0.59	
A		0.60	1.05	
Q	5	0.24	0.41	0.42
P		0.43	0.58	0.98
A		0.35	0.62	1.20

[1]Abbreviations: Q—quartz, P—porcelain, A—aluminum.

it is nearly impossible to regulate the temperature. Also the oil tended to creep up the sides of the dishes, and in some cases a small amount was lost. The results were in some cases lower than by the other methods, and this may also be due to the fact that there was an ample supply of air and oxidation may have been greater by this method. The water-bath method was unsuitable because the temperature was not high enough to drive off the camphor. In all of the determinations by this method it was necessary to heat the samples at least an additional hour in the electric oven so as to remove all of the camphor.

The only method of heating which was used in the additional experiments was the constant temperature-oven method. A large number of samples, made from different camphors and cottonseed oils, were used. Quartz dishes were used in place of glass dishes. The results are recorded in Table VII. The variations from the actual per cent of camphor in the sample are given in lieu of the percentages found. Results are given for 2, 3 and 5 hours' heating. Table VIII shows the results when the oils are heated without the camphor.

The results in Table VII indicate that the method is unsuitable for the determination of camphor in camphor liniment. In all of the samples, except 3B, there was a deficiency of camphor regardless of the time of heating. Sample 3B gave more camphor than was in the original sample. The oil used in this sample was very old and may have contained a little water. Probably considerable oxidation had also taken place in the oil before the sample was made. All of this oil was used in making the sample; so no further examination could be made. In general there was a gradual loss in weight at first owing to the evaporation of the camphor. A maximum was reached in from two to three hours and then there was a gradual gain in weight owing to the oxidation of the oil. At first it was thought that part of the camphor remained in the oil and could not be driven off, but a polariscope examination did not reveal any rotation beyond that of the original oil.

From Table VIII it may be seen that the oxidation is not constant with different samples of oil. This makes this method of analysis extremely objectionable because no correction factor can be applied. The oxidation seemed to be greater in the aluminum dishes and less in the glass dishes.

It was decided to use a number of different kinds of dishes in order to try to reduce the amount of oxidation. In addition to the dishes already used, tin, lead, nickel, silver and platinum dishes were used. The results with these dishes are recorded in Table IX.

TABLE IX.

Dish used.	17.5% camphor. Per cent found.	Per cent difference.	Oil alone. Per cent gain.
Platinum	17.14	−0.36	0.44
Tin	16.96	−0.54	0.84
Aluminum	16.48	−1.02	1.01
Quartz	17.20	−0.30	0.65
Glass	17.11	−0.39	0.78
Lead	17.34	−0.16	0.52
Nickel	16.76	−0.74	0.46
Porcelain	17.14	−0.36	0.61
Silver	17.12	−0.38	0.50

The results in the above table indicate that considerable oxidation took place in every kind of dish. The aluminum dish seemed to give the greatest oxidation and

the lead dish the least. Determinations were repeated in the lead dish and results varying from —0.16 per cent to —0.33 per cent were obtained. None of the dishes gave results sufficiently accurate so as to justify their use in the method.

DISCUSSION.

From the experimental work reported in this paper it may be plainly seen that the official method for the determination of camphor in camphor liniment is far from accurate. The method as described in the U. S. P. X is a method which will give results sometimes more than one per cent low. Any such method is objectionable in enforcement of the Pure Food and Drugs Act. The amount of this oxidation depends upon a number of factors, such as time of heating, kind and size of dish, temperature of heating and amount of air present during heating.

CONCLUSIONS.

1. A critical study of the U. S. P. method for determination of camphor has been made.
2. The method has been found to give consistently low results.
3. The error in this method is due to the oxidation of the olein in the cottonseed oil.
4. Various kinds of dishes and various methods of heating have been used, but none of these have proved satisfactory.

A more satisfactory method has been developed for this determination by the use of the vacuum oven and will be reported in a later communication.

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THE PREPARATION, ANALYSIS AND LEAD-ION CONCENTRATION OF SOLUTIONS OF COLLOIDAL LEAD.*

BY H. S. KEELAN, R. B. SMITH AND W. G. CHRISTIANSEN.

During the course of some work on the preparation of colloidal lead for cancer therapy some observations have been made which are of interest in connection with this problem.

When it was found that colloidal lead solutions which had been prepared without the use of anaerobic technique throughout turned white upon boiling for sterilization, the procedure to be described was developed and found to be entirely satisfactory. The water used for all purposes during the preparation of the colloidal solution was boiled for half an hour, covered with an inch layer of liquid petrolatum and cooled. Where any water was needed, it was siphoned from beneath the oily layer. The granulated lead to be used was exhausted of air by putting it into a vacuum desiccator, evacuating the latter and breaking the vacuum with nitrogen; the process was repeated three times.

One hundred and sixty cc. of a 1% gelatin solution, 148 cc. of a solution containing 1 mg. of potassium chloride per cc. and 92 cc. of water were put into

* Scientific Section, A. PH. A., Portland meeting, 1928.

a liter beaker and covered with 300 cc. of liquid petrolatum. Enough granulated lead was then added to form a layer a quarter of an inch thick on the bottom of the beaker. The liquid in the beaker was stirred slowly, using a mechanical agitator; rapid agitation causes the arcs which are to be produced to break. Using lead rods and a 110-volt D. C., the lead was sparked for fifteen minutes and the resulting solution was transferred to centrifuge tubes by means of a pipette; by introducing some liquid petrolatum into the tubes, the aqueous solution can be pipetted from beneath the liquid petrolatum in the beaker and run under the oil in the tube. After the solution has been centrifuged for four minutes at 1200 r. p. m. it is poured into a 400-cc. beaker containing 100 cc. of liquid petrolatum.

The ampuls to be filled with this solution were placed in a vacuum desiccator and the latter was evacuated and filled with nitrogen several times. The ampuls were then quickly removed from the desiccator and stuck down through the liquid petrolatum layer into the colloidal lead solution. The beaker containing the solution and inverted ampuls was then placed in a vacuum desiccator and the desiccator was evacuated so that about half the nitrogen in the ampuls had been removed. The vacuum in the desiccator was then broken with nitrogen and the colloidal solution rose in the ampuls. The latter were then quickly lifted from the beaker and sealed in a gas flame. The solution was then sterilized by autoclaving the ampuls for half an hour at ten pounds steam pressure. The lead content of these solutions was 5 to 6 mg. of lead per cc.

These lead solutions were injected into cancerous patients with more or less negative results. The preparation was not toxic, and the patients suffered none of the bad reactions, such as chills, etc., which have been described in the Blair Bell publications. An interesting observation was noted upon administration of a solution which was made from water which had been boiled the night before and sealed from air immediately with liquid petrolatum as usual. When the patient was injected with this solution, the cancer cells broke down so rapidly that blood was found in the urine, and a blood transfusion was necessary to save the patient. Inasmuch as the solutions obtained by use of freshly boiled water did not produce such rapid disintegration of the cancerous tissue as that noted in the case just referred to it may be that the water should be allowed to stand for a certain length of time prior to use. One normal sample which had aged twelve days prior to use caused a patient to have chills, but this was noted in none of the other samples less than twelve days old.

Experiments were made to determine whether liquid petrolatum exerted any effect other than that of protection against air. It was noticed that at the water-oil interface there was a scum suggesting that the insoluble impurities of both the oil and water phases had collected there. Solutions of lead acetate, with known quantities of lead present were treated with liquid petrolatum both with violent agitation and with the slow stirring used in the regular process. There was a loss of lead from the aqueous phase amounting to 20.5% in the first case and 8.2% in the second.

ANALYSIS OF COLLOIDAL LEAD SOLUTIONS.

Five cc. of the standard lead solution (1-Gm. lead-acetate crystals per liter) were diluted to 90 cc. with water in a 100-cc. graduate, 100 mg. of sodium acetate,

and then 10 cc. of saturated hydrogen-sulphide solution were added to produce the brown coloration. Ten cc. of the unknown colloidal lead solution were treated with 0.4 cc. of glacial acetic acid (excessive quantities of the acid cause the brown color of the sulphide solution to be incorrect) and shaken until a clear solution is obtained; the solution was diluted to 100 cc. in a volumetric flask. One cc. of this solution was put into a 100-cc. graduate and diluted to 90 cc.; 500 mg. of sodium-acetate crystals were added followed by 10 cc. of hydrogen-sulphide water. The depth of colors of the standard and unknown solutions were compared in a colorimeter.

LEAD-ION CONCENTRATION OF COLLOIDAL LEAD SOLUTIONS.

Lewis and Brighton[1] determined the voltage of the normal lead electrode with respect to the normal hydrogen electrode and for the chain

$$Pb, Pb^{++}//H^{+}, H_2; \ E^\circ = 0.1297$$

In our study of colloidal lead the measurements were made with a saturated half cell and for this chain

$$Pb, Pb^{++}//Sat.\ E; \ E^\circ = 0.375$$

Adopting the procedure of expressing the hydrogen-ion concentration of a solution as the negative logarithm of the H-ion concentration, *i. e.*, p_H, we have expressed the lead-ion concentration of a solution in terms of p_{Pb}. When a saturated half cell is used this may be calculated according to the following equation.

$$p_{Pb} = \frac{E - 0.375}{0.02955}$$

Lewis and Brighton[1] state that lead being a soft ductile metal gives steady and reproducible readings against solutions of its ions; our work confirms this statement. The above authors found that the lead amalgam electrodes gave somewhat better results than solid lead electrodes; since the amalgam would dissolve lead from the colloidal lead solutions and thereby change in composition, these electrodes were not investigated. The electrodes used were bars of C. P. lead about 7 mm. in diameter which were scraped with a sharp-edged piece of glass and then burnished with a piece of glass rod immediately before being placed in the solution. The solutions were stirred with nitrogen while the determinations were being made. The following chain was used.

Pb, Coll. Pb Sol.//Sat. E

In order to reduce the diffusion of salts from the salt bridge into the colloidal lead solution a $N/10$ KI salt bridge was used between the colloidal lead solution and the saturated half cell.

It was found that there were no great differences between the lead-ion concentrations of preparations made by the method described in the first part of this paper. The p_{Pb} was found to vary from 8.74 to 10.28 which corresponds to lead-ion concentrations of 1.8×10^{-9} to 5.3×10^{-11}. It was also found that the lead-ion concentration was not altered by sterilization of the ampuled solution as described above.

In every case during the preparation of the colloidal lead a white material

[1] Lewis and Brighton, *J. A. C. S.*, 39 (1917), 1906.

appeared at the oil-water interface, and it was thought that this material and not the colloidal lead might be determining the lead-ion concentration of the solution. It was further noted that when air instead of nitrogen was passed through a colloidal lead solution a heavy white precipitate slowly developed which was similar in appearance to that which had been noted at the oil-water interface. Under these later conditions Pleissner[1] has shown that 2 $PbCO_3.Pb(OH)_2$ is formed. A colloidal lead solution which had been found to have a p_{Pb} of 9.06 was aerated for $1^3/_4$ hours; after this treatment the resulting solution was almost white and the p_{Pb} had dropped to 8.39, *i. e.*, the lead-ion concentration had increased from 8.7×10^{-10} to 4.1×10^{-9}.

A sample of 2 $PbCO_3.Pb(OH)_2$ was prepared by mixing solutions of lead acetate and ammonium carbonate and converting the lead carbonate into the basic salt by repeatedly boiling with water, washing with cold water and again boiling with water. The final preparation was boiled and cooled in a vacuum. The p_{Pb} of the saturated solution at 25° C. was 3.96 which is equivalent to a lead-ion concentration of 1.1×10^{-4}.

Various values for the solubility of 2 $PbCO_3.Pb(OH)_2$ are given in the literature and it is possible that these variations may be due to varying CO_2 pressure which changes the solubility of the basic carbonate. One of the best values is that given by Auerbach and Pick[2] in terms of the solubility product, *i. e.*, 3.5×10^{-46}. A saturated solution of the pure salt containing no excess of any of the ions would therefore be equal to $\sqrt[12]{3.5 \times 10^{-46}}$ or 7.6×10^{-3}. The value found for the pure salt by the lead-ion concentration method as given above was 1.1×10^{-4}. A saturated solution of $Pb(OH)_2$ has a solubility product variously given as 0.82×10^{-15} and 0.47×10^{-15} to 0.91×10^{-5}.

The lead-ion concentration of these salts could not, therefore, be less than 10^{-5} so that it could not be either basic lead carbonate or lead hydroxide which determines the lead-ion concentration of colloidal lead solutions. The colloidal lead solutions as prepared were also examined for the presence of CO_2 and 100-Gm. samples containing 600 mg. of colloidal lead, gave no quantitative test for CO_2.

Lead hydroxide unites with lead to form complex lead hydroplumbites which are stable even in the dry form up to 130° C. No data are given on the solubility of these compounds so that it is not possible to calculate the lead-ion concentration of their suspensions. It would seem possible, however, that complex salts of this type are the ones which determine the lead-ion concentration of colloidal lead solutions.

SUMMARY.

The preparation and analysis of colloidal lead solutions are described.

The p_{Pb} of colloidal lead solutions was found to be between 8.74 and 10.28.

There are indications that the lead-ion concentration of colloidal lead solutions is determined by the presence of a small amount of a very insoluble lead salt but this salt could not be identified either experimentally or from data in the literature.

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[1] *Arb. Kaiser Ges. Amt.*, 26 (1907), 403.

[2] *Ibid.*, 26 (1907), 413.

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Study of the composition of sodium bismuth tartrate
Jour. A. Ph. A., 18 (1929), 450

Make your preparations early for attending the Rapid City meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION.

NOTES ON EXTRACTION AND PRESERVATION OF FLUIDEXTRACT OF CASCARA.*

BY H. E. BECKER AND F. F. BERG.

Attention was drawn to a statement that sugar, if used in the extraction of Cascara, resulted in better extraction and in order to determine whether such treatment was advantageous, a series of percolations were conducted; as follows:

Four thousand grams of drug were divided in four portions of one thousand Gm. each:

Portion A.—One thousand grams moistened and extracted with boiling water according to U. S. P. directions.

Portion B.—One thousand grams moistened and extracted with a menstruum consisting of boiling water in which was dissolved 10% of sugar.

Portion C.—One thousand grams treated with Magnesium Oxide for debitterization and extracted with boiling water as directed by U. S. P. method.

Portion D.—One thousand grams treated in same manner as *C* except a menstruum consisting of boiling water containing 10% of sugar.

The preparations so obtained by the four outlined experiments were examined analytically to determine relative extractive properties of boiling water and boiling water containing sugar. The total solid content as shown upon examination of all four samples indicated results so closely analagous to each other that the fractional per cent of variation was not beyond the experimental error of the analytical procedure. The color of comparative preparations also indicated no marked difference over the official method.

Further attempts to determine by physiological experiments any marked difference also resulted in failure. While it is admitted that such physiological tests are not thoroughly reliable, the work accomplished could readily be interpreted as indicating no marked advantage which would be sufficiently valuable to warrant any suggestion of sugar addition to menstruum.

It occurred to us that possibly some benefit might be derived with respect to keeping quality of the preparations in which sugar had been used in the menstruum, hence the four previously enumerated experiments were set aside for subsequent observation as to relative stability.

Fourteen months later an examination of the stored samples showed equality with respect to degree of precipitation and other physical criteria used in judging pharmaceutical elegance.

A point of interest in the foregoing work, which it seemed worth while recording, was that all the preparations made were finished or preserved with 10% of alcohol, which is one half the quantity now prescribed for Fluidextract of Cascara and Fluidextract of Cascara Aromatic.

CONCLUSIONS.

That the use of sugar in the menstruum is not an aid to extraction.

That 10% alcohol is sufficient for preservation of Fluidextract of Cascara

* Section on Practical Pharmacy and Dispensing, A. PH. A., Portland meeting, 1928.

and might well be given consideration in the forthcoming revision work of the U. S. P.

PHARMACEUTICAL AND CHEMICAL
LABORATORIES OF E. R. SQUIBB & SONS,
BROOKLYN, N. Y.

EPIPHYTIC, NOT PARASITIC.*

BY FREDERICK J. WULLING.[1]

All who successfully pass the Board examinations for licensure are presumably capable of practicing pharmacy in its professional sense, but many licensees practice very little or not at all. The reason is obvious: the fifty-four thousand or so drug stores in the United States are too many to afford practice for all registered pharmacists. *Strictly pharmaceutical service needs are fairly constant; at any rate they are not increased as drug stores multiply.* One-fourth the number of drug stores now existing would be ample to care for all pharmaceutic needs. In other words, according to an estimate based on several reliable sources of information, the totality of business done in the retail drug stores of the entire country is twenty-five per cent or less professional and seventy-five or more commercial (of which the culinary represents of late a respectable proportion). In still other words it may be said professional practice has been diluted or attenuated three hundred per cent or more by commerce or trade. There is as much pharmacy as ever or more and the development of pharmacy in its scientific and arts aspects has never been at a higher point and is keeping pace with development in all other fields of science, which proves that pharmacy is sound and virile despite the commercial obscuration under which its functional aspect has been somewhat hidden. The high state of development pharmacy has reached despite its many handicaps, indicates that drug store commercialism isn't parasitic but epiphytic and that its separation from pharmacy, or *vice versa*, is easily possible. Pharmacy and trade have not ever coalesced. Pharmacy is still pharmacy and in essence is incompatible with trade and in due time will have entirely extricated itself from its temporary entanglement. The separation is already well under way. It is working from both ends, because trade is retreating from pharmacy concurrently with the withdrawal of pharmacy from commerce. The fortunate thing about it all is that nobody seems alarmed or displeased and all affected seem rather complacent. The head of a chain of commercial drug stores recently said that if the Pennsylvania ownership law is upheld by the Supreme Court, his company will turn their eighteen stores in a Pennsylvania city into purely commercial stores and that the change would be hardly noticeable. Another chain manager is reported as having said his chain is doing less than ten per cent of pharmaceutical business and yet the Boards treat them as though they were doing a hundred per cent, and that they are ready to get away from pharmacy law regulations and requirements, which only annoy them.

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* Section on Practical Pharmacy and Dispensing, A. PH. A., Portland meeting. The paper was referred to President Jones for consideration.

[1] University of Minnesota.

To illustrate the withdrawal of pharmacy from the present duality of activity in so many stores, I will quote a number of correspondents whom I invited to give me such comments covering their withdrawal experience as they might be willing to volunteer. These correspondents are persons who occupied themselves formerly with the almost exclusive practice of old-time prescription stores, but who were forced to engage in commercial activities as a result of the increase of commercial stores, many of them belonging to chains, in their respective localities, and who soon learned that the commercialists, because of their expertness in merchandising, created a competition which they had not the ability nor capital to meet successfully. They had the choice of going out of business altogether or of trying to rehabilitate themselves as professional pharmacists. They chose to do the latter and did so with entire success. I am now not speaking of those pharmacists who have established new, purely pharmaceutical laboratories in office buildings or away from busy and expensive traffic or business centers, and who are growing in numbers.

From one correspondent in an eastern city, I quote at length:

"Fifteen years ago my almost exclusively pharmaceutical store was located in a residence district bordering on a business section of the city. Thirty to thirty-five prescriptions a day was an average and sales amounted to about sixty dollars a day. Gradually the business section extended past and three blocks beyond my store, and five years ago five additional stores, including three chain stores, surrounded me. Mine had been largely a family business and now practically all families had moved away. For that reason and because of the cutting and merchandising of my competitors, my business ran down to where I was losing out very fast. I owned the three-story building which was located on a corner and contained my corner drug store and the adjoining small grocery store and apartments above. Nothing seemed left for me to do except to do some merchandising myself, so I enlarged my floor space by adding the store next door, the owner of which had been driven out of business by chain groceries. Renovation and modern fixtures and a stock of merchandise similar to that of my invaders cost me about twenty-five thousand dollars. In three years I was nearly on the rocks and realized that I was not as good a business man as I was a pharmacist. Acting upon this expensively learned lesson, I remodeled my building, converting the upper apartments into offices and the street floor into three stores, the inside one of which I fitted out and stocked modestly as a professional pharmacy. Of the offices I rented two to physicians and one to a dentist. Then I went after pharmaceutical business. I advertised myself in one-quarter columns in three of the leading papers as *an exclusively professional pharmacist rendering exclusively professional pharmaceutical service;* got six of the former fifteen doctor friends to send their patients for their medicines to me; supplied a near-by private hospital with the medicines and solutions it needed; created a business in medical supplies for dentists, selling now to them about fifty gallons of Antiseptic Solution monthly, among other things; sent personal letters to as many of my former family customers as I could locate, with the result that some of them came to me from clear across the city, etc. I used what little business ability I had in me to build up a pharmaceutical practice and succeeded with only a fraction of the effort I put so disastrously into merchandising. My new venture I started on January 2, 1927. In December I added twenty feet to the rear of my store which the adjoining men's furnishing store let me have, and there I manufacture every preparation that can be made in a small laboratory. Prescriptions and customers come to me from all parts of the city, and I do not have to depend upon my immediate locality for business. By July 1927, I was doing about twenty prescriptions a day and thirty-dollar sales. Now, May 1928, prescriptions average sixty and sales over a hundred dollars. Not only am I having a good practice; I feel like a professional man and have more self respect; am happy and contented, which I certainly was not while merchandising. My practice is growing and has a momentum, but of one thing I am sure: I will not let it expand beyond where I can give it my personal service and attention, for on these my reputation and success as a pharmacist now depend."

Some of the lessons arising out of this man's experience are:

1. A pharmacist is not a business man and cannot expect to win out against business specialists.

2. Even a professional pharmacist to be successful now-a-days must put some business methods into the conduct of his practice.

3. Professional pharmaceutical service is personal service and might wisely be limited to the time and capacity of the person giving the service rather than assuming more and delegating part of it to others. The pharmacist quoted told of a case within his knowledge where two partners who were conducting a very successful pharmaceutical practice became so drunken with success that within two years they opened three branches in different parts of the city, but soon their original pharmacy suffered a marked decline in business because of lack of personal attention upon which they had built it so successfully. Now they have contracted down to two pharmacies, to each of which one of the partners gives his entire time and service in the hope of building up both by regaining ground lost in the expansion.

4. Any professional practice must be based upon professional-mindedness and primarily upon a service motive and only secondarily upon a gain motive.

5. Merchandising requires much more capital and involves, for pharmacists at any rate, more uncertainty, risk and corresponding anxiety, than professional practice.

Another pharmacist reports that he rehabilitated his professional practice which had become badly diminished and demoralized through commercial expansion, by eliminating his merchandise and putting his full energy upon gaining coöperation from physicians, furnishing an orphanage and a private hospital in his neighborhood with their needed pharmaceutical supplies, giving a clinical service in urinalysis, blood counts, sputum examination for tubercle bacilli, etc., analysis of medicinal products, supplying physicians with office medicinals, keeping a good supply of biologicals and making practically all of the galenicals needed in his practice. He has built up a good business and has more leisure than he ever had without neglecting his practice.

Another interesting case is the one in which a recent graduate inherited the old-established store of his father which had gradually become so commercialized that it really was no longer a drug store, but was doing a paying commercial business. The young man wanted to practice pharmacy so he sold his "trade emporium," reserving the drug end of it. This he removed to a side street location where within three years he developed a dispensing practice of nearly a hundred prescriptions a day. He makes a full line of household remedies and toilet preparations as well as every U. S. P. and N. F. preparation prescribed or needed in his practice. He has established an enviable reputation among physicians, because of his professional independence and the confidence this engendered. For instance, he refuses to dispense prescriptions calling for proprietaries or preparations of specific manufacture when he can prepare corresponding items himself. He succeeded in demonstrating to physicians that he is a thoroughly qualified and reliable professional pharmacist and that he can make medicinal preparations with at least as much thoroughness and exactness as they can make diagnoses. At a luncheon talk before a medical society he said: "As soon as you are willing to buy your diag-

noses, I will be willing to buy the items I now make but no sick person ought to patronize us." He offered to help any doctor to select remedies to fit his diagnoses and now he is frequently asked for coöperation in that respect. The young man, now just thirty, it should be said, is a good mixer and meets the doctors as their social equal and is accepted as such. He possesses in addition to the B.S. in Pharmacy, also the classical B.A. degree. While he is aggressive and outspoken, he has tact and good judgment and a good approach and personality and is generally liked for these qualities. He has the educational, family and social background that all professional practitioners ought to possess and comes from a social stratum from which all future pharmacists should be selected henceforth to insure adequate professional standing for pharmacy.

There are other cases I could cite, and no doubt pharmacists everywhere know of similar examples of professional rehabilitation. Thi. trend will gain acceleration as the possibilities it promises become better known and developed and will become one of the agencies for the restoration of pharmacy to its natural and rightful status. The greatest necessity toward this end is the selection of much better recruits. We are training too many students who lack the needed professional ideals and outlook and background. We must look more to quality than to quantity. The fact is a serious one that so many applicants for licensure fail in the Board examinations. Although the Board examinations are being constantly increased in scope and standards, they are still too easy to assure an adequate practitional standard. It is wrong from the standpoint of the profession and especially from that of public welfare finally to register those who repeatedly fail in the examinations. Passing technical examinations alone is not sufficient. The applicants should be required to bring evidence that they possess the prerequisites of sufficient academic education, right professional ideals and right attitude toward the profession as a living entity worthy of the fullest support, loyalty and devotion. We pharmacists have it in our own hands to give quality and character to and to assure commensurate recognition of our calling. Resolution and determination are necessary to this end. Other and less responsible professions have outdistanced and outclassed us only because they have established, insisted upon and maintained higher standards of practice and especially of personnel. We have lately made some progress in these respects but, as a group, have not shown sufficient executive and administrative capacity and insistence to reach that height of functional activity comparable with public need and with standards and activities of other professions. A collective and properly supported program of forward work must sooner or later be decided upon by all or the majority of interests. As I have often stated, the most rapid and effective way is to form an association of the associations now existing and to give to it powers akin to those possessed by our federal government in its relation to states on the one hand and to foreign countries on the other. That central association should have an executive committee or "cabinet" with sufficient power to set the machinery into motion to bring about the needed results. American pharmacy can do this if it so wills. We should overcome our collective inertia with concerted and coöperative action.

EDUCATIONAL STANDARDS FOR TEACHERS OF PHARMACY.*

BY B. V. CHRISTENSEN.[1]

During the past few years there has been considerable discussion in the meetings of the American Association of Colleges of Pharmacy and the AMERICAN PHARMACEUTICAL ASSOCIATION relative to educational standards for students of pharmacy but very little has been noted regarding standards for teachers of pharmacy. It appears that the efficiency of the teacher has been implied and that if there were any indications of unsatisfactory results the fault rested upon the student rather than the teacher. To be true, there have been some excellent papers presented dealing with teaching methods and, in one case, a very excellent discussion advocating that teachers of pharmacy be required to satisfactorily complete a minimum of pedagogical units was presented but, in the main, the discussions have dealt primarily with student requirements.

While the requirement of practical pedagogical courses would probably be advisable, if not highly desirable, it appears that present conditions do not warrant such a procedure and that before this should come specific standards regarding the educational training of teachers of pharmacy which should be applied to all colleges belonging to the American Association. The actual situation existing in our colleges of pharmacy is illustrated by the following data concerning the educational qualifications of pharmacy teachers, which was obtained from a study of recent catalogs of twenty colleges representing the East, Middle West, West and South and also the independent colleges. Only faculty members ranked as instructors or above were considered in this tabulation:

EDUCATIONAL TRAINING OF TEACHERS IN 20 COLLEGES OF PHARMACY.

Total.	Ph.G.	Ph.C.	Bach.	Master.	Phar.D.	Ph.D.	Sc.D.	M.D.	D.D.S.	D.M.D.	P.D.	O.	No. of schools.
350	41	16	66	63	15	86	6	43	2	5	2	5	20
Per cent	11.7	4.5	19	18	4.2	24.5	17	12.2	0.6	1.4	0.6	1.4	

This tabulation indicates that about 45 per cent of the teachers in Colleges of Pharmacy have some form of a Doctor's degree, while about 18 per cent have less than a Bachelor's degree. This appears to be rather an encouraging situation but a further classification, as indicated below, indicates a situation which is a strong indictment against Pharmacy. In this tabulation the academic training of teachers according to subjects is shown.

EDUCATIONAL TRAINING OF TEACHERS ACCORDING TO SUBJECT TAUGHT.

	Ph.G.	Ph.C.	Bach.	Master.	Phar.D.	Ph.D.	Sc.D.	M.D.	D.D.S.	D.M.D.	P.D.	No deg.	Total.
Pharmacy	19	4	17	12	6	4		1	1	1	1	2	68
Pharmacognosy	10	2	5	7	2	2	1	3		1	1		34
Chemistry	7	8	10	15	5	37	3	1					86
Botany	3	1	1	4	1	4	1				1		16
Bacteriology	1		1	2		2	1	9					16
Physiology				1		4		14					19
Pharmacology			1	2	1	1		10					15
Total	40	15	35	43	15	54	6	38	1	2	3	2	254

* Section on Education and Legislation, A. PH. A., Portland meeting, 1928.

[1] Professor of Pharmacognosy and Pharmacology, College of Pharmacy, University of Florida.

This tabulation indicates that of the teachers of Pharmacy and Pharmacognosy, only about 20 per cent hold some form of a Doctor's degree, while 33 per cent hold less than a Bachelor's degree; of teachers of chemistry, 51 per cent hold a Doctor's degree, while about 17 per cent hold less than a Bachelor's degree; of teachers of Botany, about 37 per cent hold a Doctor's degree; of teachers of Bacteriology, 75 per cent hold a Doctor's degree; of teachers of Physiology, 95 per cent hold a Doctor's degree; and of teachers of Pharmacology, 80 per cent hold a Doctor's degree. A further check indicates that of the teachers of Chemistry, 4 with a Pharm.D. and 4 with a Ph.D. are listed as teachers of Pharmaceutical Chemistry. This implies, consequently, that most of the teachers of Chemistry with a Doctor's degree are teachers of general or non-professional Chemistry. Most of these are members of the Chemistry Department of the university and students of Pharmacy attend their classes.

Is this not a strong indictment against the schools of pharmacy and against pharmacy as a profession? Surely Pharmacy and Pharmacognosy must be considered the basic subjects of the profession and yet we find that the most inadequately prepared teachers handle these subjects. Do we as pharmacists wish to admit that these subjects are not fundamentally important and do we wish to admit that a Ph.G. can teach pharmacy but that a Ph.D. is necessary to teach Chemistry or English or Languages? Would it not be advisable to require that all class-room instructors hold a Doctor's degree in his respective field of Pharmacy, Pharmacognosy or Pharmaceutical Chemistry as the case may be? Or possibly require that a minimum number hold the Doctor's degree and the rest a Master's degree?

This requirement should not, of course, be made retroactive. There are at present many excellent teachers in our schools of Pharmacy who do not even hold a Bachelor's degree, who, because of many years of experience have obtained an adequate fund of pertinent information, but is it not likely that this was done at the expense of the students, particularly in the first few years of teaching? Neither is it intended to imply that a teacher with a Ph.D. is necessarily always better than one without; however, other conditions being equal, there is no question but that the training obtained in earning a higher degree provides a background that can only be equalled by years of experience. Not only that, but this training implies a higher type of teaching from the beginning and it is not necessary that students suffer from poor instruction while the teacher is struggling to keep "one jump ahead of them" academically. Furthermore, if we consider the relative starting points of a teacher with a B.S. degree, for instance, and one with a Ph.D. degree, with an equal rate of progress on the part of these teachers through experience, students of pharmacy are not only benefiting from a higher type of teaching from the teacher with the higher degree, but they continually enjoy a type of instruction that is never equalled by the man with the lower degree.

It might be interesting as well as applicable to note here the three stages from the standpoint of theories of instruction through which normal schools, now called Teachers' Colleges, have passed. During the earlier stages of Teachers' Colleges their policies of instruction were based on the theory that telling was teaching and, therefore, a successful teacher should necessarily be thoroughly grounded in the so-called fundamentals and possess a fund of reserve information.

This was followed by a period (about 1890 to 1915) when it was held that method was the all-important requisite for successful teaching, *i. e.*, that one who knew how to teach could successfully teach any subject regardless of his academic knowledge of that subject. The third and present stage is a sort of compromise between the two preceding extremes and Teachers' Colleges now base their instruction on the premise that academic knowledge is first and above all essential and that methods of teaching are highly desirable.

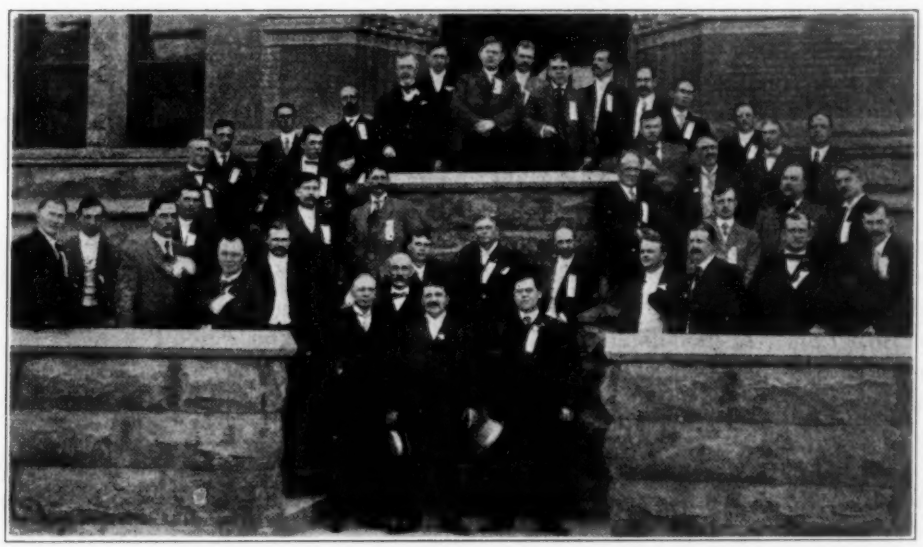
This policy, namely, that academic preparation of teachers must come first and then methods, has now become definitely established as being sane and productive of satisfactory results not only on the part of Teachers' Colleges but colleges and universities in general. As a result the courses of instruction in Teachers' Colleges have been lengthened from two to four years in order to provide the academic background considered essential for high school teachers, while at the same time the high school course has not been extended beyond the usual 12th grade. Many states now require that all high school teachers must hold at least a B.S. degree in their respective lines, while some states, such as California, require a Master's degree. If it is necessary for a high school teacher to have a minimum of 4 to 8 years of educational training beyond that of the students they are teaching, is it consistent to expect a teacher of pharmacy with educational training a year or so beyond that of his students and, in many cases, less than that of his students, to provide adequate instruction? Do teachers of pharmacy feel that they are in a class by themselves, specially endowed for the job at hand? Law schools, dental schools and medical colleges have for several years required a higher type of training on the part of their teachers than have colleges of pharmacy. Colleges and universities are demanding that teachers of History, Physics, Foreign Languages, etc., hold a Doctor's degree. Does it not, therefore, behoove the colleges of pharmacy to give this matter serious consideration and take some action and, particularly, in view of the fact that courses are being extended to three and four years and in some cases to graduate courses? Then again, haven't Colleges of Pharmacy been placed in a peculiar situation as a result of recent legislation in a majority of states requiring college graduation as a prerequisite for registration? Colleges of Pharmacy, by favoring such legislation, have gone on record as approving and commending educational training as a necessity for higher professional standards for the pharmacist, but what about the teacher of Pharmacy? Since college graduation has been made a prerequisite for registration it appears logical and reasonable that prospective pharmacists have a right to demand a high type of teaching from the colleges. With inadequate educational training can teachers of Pharmacy furnish an adequate type of instruction?

Further, have not Colleges of Pharmacy been active in the agitation to have the State Boards raise the standards of examinations in order to raise the professional standing of the druggist? How can colleges of pharmacy consistently expect all other agencies concerned with registration of pharmacists to raise their standards when they themselves continue to maintain inadequate standards for teachers of Pharmacy?

To summarize, it appears that Colleges of Pharmacy have been active in insisting that educational requirements be raised for students, that college training be made a prerequisite for registration and that State Boards of Examiners raise

the standards of examinations, while at the same time little has been done toward raising teachers' standards. Does it not appear that there has been too much circumspection and too little introspection on the part of Colleges of Pharmacy?

In conclusion, would it not be advisable to require that all teachers, in Colleges of Pharmacy belonging to the American Association, with the rank of assistant professor or above, hold some generally recognized form of a Doctor's degree (Ph.D. or equivalent) and that all teachers in such colleges with the rank of instructor hold a Master's degree? This requirement not to be retroactive, of course, but to apply to all future additions to teaching staffs and in filling future vacancies as they may occur.



FIRST MEETING IDAHO PHARMACEUTICAL ASSOCIATION—MAY 30, 1907, AT BOISE.

First row next to wall reading from left to right: C. K. McCrum, Boise; A. N. Sprague, Twin Falls; unknown; Tom Poole, Nampa; N. L. Smartwood, Salt Lake City; F. E. McClure, Boise; Dr. I. R. Woodward, Payette; M. D. Fleming, Caldwell; B. B. Davis, Emmett; J. C. Tracy, Hailey; J. M. Reeves, Middleton; S. G. Wilson, Meridian; S. R. Dearey, Boise; unknown; C. O. Ballou, Boise; unknown; Robert McKnight, Nampa; unknown; W. S. Whitehead, Boise; Charles Baker, Mackay.

Second row, left to right: G. C. Baker, Boise; unknown; Ben Reed, Payette; D. Orr Poynter, Montpelier; Clyde Thurston, Payette; W. E. Bailey, Salt Lake City; John Kirkpatrick, Boise.

Third row on right of steps: Charles L. Joy, Boise; F. E. Smith, Nampa; W. B. Campbell, Denver.

Back row of group in front of steps: H. B. Whittlesey, Pocatello; J. E. Rawlings, American Falls; S. K. Paxton, Mackay; F. R. Walker, Weiser; J. B. Lattimer, Boise; R. W. Smith, Mountain Home. Three in front: E. O. Silverthorn, La Grande, Ore.; J. J. Buehler, Pocatello; R. A. Wells, Seattle.

The present officers of Idaho Association are: *President*, A. A. Walker, Boise; *Vice-President*, H. B. Whittlesey, Pocatello; *Treasurer*, Orville Jackson, Eagle; *Secretary*, Herschel M. Cummins, Melba.

DEPARTMENT OF BUSINESS MANAGEMENT

Conducted by Paul C. Olsen.*

COMMENTS, QUESTIONS AND SUGGESTIONS ARE INVITED AND WELCOME.

Readers are invited to submit comments, criticisms and suggestions regarding the material which appears in this department. The Editor also will undertake to answer questions regarding general problems of business management. Letters of general interest will be published, but the writer's name will not be revealed without his permission.

AFTER ALL WE'RE ONLY HUMAN.

In the present-day discussions of the weaknesses of the individually-owned store, there is expressed frequently the opinion that the chains in their management and operation present a picture of what the individual store could and should be—if it only would.

Without in any way attempting to excuse or minimize the glaring effects which are so evident in the conduct of many individual stores, I want to point out that one doesn't have to travel very far or look very hard to see that all is not 100 per cent in the supposedly paragon-like chains.

For instance, a young woman employed as a soda dispenser at a station soda fountain evidently has more than an ordinary fondness for dumb animals. In full view of myself and other patrons I saw her fill a saucer with milk for the station cat and then allow the cat to consume his noon-time drink behind the fountain in the rather noisy fashion common to such animals. As if this weren't enough, when the cat was through, the saucer was given one quick dip in a basin of cold water and then left to drain until the next human patron should require that particular bit of crockery.

Perhaps the young lady is to be commended for her kindly sympathy for dumb animals. Never-the-less there are sanitary aspects of the situation which cannot be commented upon so favorably.

Then there is the young salesperson in a chain drug store with her name and number neatly typewritten on a badge she wears on her chest. It was birthday time and I was thinking of perfume. I asked for Orchidee Bleue.

Without so much as making a move to show it to me she exclaimed, "Oh, that's very expensive. We have other perfumes much cheaper." Evidently the condition of my last year's overcoat had telegraphed to her that I was no person to be indulging in such extravagances and that she would put a stop at once to any such notions! She did—in so far as this store was concerned.

We are told that the cigar chains put their stores on the busiest corners because there is the opportunity to do the most cigar business. This is excellent from the standpoint of pedestrian buyers but not so effective in so far as automobile shoppers are concerned. Friends had taken us automobiling. We stopped for a moment in a forbidden place in front of such a store. I went in for cigars. There were two salespeople and no one else in the store.

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* Instructor of merchandising, Wharton School of Finance and Commerce, University of Pennsylvania, Lecturer on Business Administration, Philadelphia College of Pharmacy and Science.

Needless to say it was entirely unexpected that I should spend five uneasy minutes waiting for the attention of one of them while they debated heatedly the proper way to report to headquarters the amount of "Mother's Day" candy sales.

I appeared in another chain drug store a minute or two before midnight. Instead of the smiling greeting which some observers tell us is the invariable accompaniment of chain store merchandising, I wasn't greeted at all. Instead, the man behind the prescription counter to whom I had addressed myself turned toward an invisible assistant in the back room and bawled, "Hey, Bill, lock that front door before anybody else gets in here. We don't want to be here all night."

I apologized for my unintentional intrusion and withdrew as quickly as possible.

Countless similar experiences could be related. These, however, are sufficient, I think, to illustrate my point. I am not setting them down simply as a rebuttal of the frequent criticisms of the merchandising absurdities to be found in individually-owned stores. I am frank to say that the experiences quoted and many others like them could have happened just as readily in individually-owned stores.

What I want to emphasize is that the retail sale of merchandise is not a mechanical process which can be standardized by a genius in a headquarters' office and forever afterward be depended upon to function infallibly.

The engineers who discovered and developed the principles of mechanical refrigeration know that their product will function perfectly for an indefinite number of years with practically no attention. No such predictions can be made with respect to a retail merchandising organization.

The most successful chains have been those which are the projection of the personality and methods of the genius who created them. Usually these organizations have developed from a single store. The proprietor has built and maintained a successful store. He then realizes that the amount of business which can be done in a single store is definitely limited by conditions beyond his control.

Why not, therefore, repeat his success in another promising location? He can put his most capable assistant in charge of the new store, or he can go to it himself and leave his assistant in charge of the established store. As additional competent assistants are developed, the number of stores in the chain grows.

With each increase in the number of stores in the chain, it becomes apparent, however, that the personality of the genius who created it must be spread more and more widely. The personality which is felt so intimately and constantly in the conduct of one store is spread with increasing thinness as the number of stores grows.

It becomes necessary to employ assistants whose function is not retail selling, but rather to travel from store to store in efforts to project second hand the personality of the directing head. They explain the plans of the management and see that they are carried out. I do not mean to minimize in the least the importance and value of this supervision. Many individually-owned stores could increase their profits tremendously if they were supervised closely by persons outside the store and the directions of those outside supervisors carried out religiously.

The point is that this supervision costs money, and lots of money, because the men competent to do such work are not to be hired for clerk's wages. Supervision of chain store activities is vitally necessary, but don't forget also that it is decidedly costly.

And even with this costly supervision, the chains are frank to admit that they

do not achieve perfection in retail merchandising, or anywhere near it. The few instances quoted in the beginning of this article could be multiplied by the thousands from actual facts recorded in the files of chain store organizations themselves.

The electric street car quickly supplanted the horse car. In the United States mechanical means of harvesting have superceded the flail. The typewriter takes the place of the letter press.

The chain store method has advantages which are not to be denied. Anyone who thinks, however, that the individually-owned store is bound to become as extinct as horse cars, flails and letter presses is overlooking a fundamental and vital difference. Retail merchandising is of such a character and necessarily always must remain of such a character that it cannot be completely merchandized and standardized. The most important part of it is and always will be the personal face to face contact of the salesperson with his customers.

As long as individual stores can perform this vital function as well as or better than other types of retail organizations, they will continue to survive.

AMALGAMATION OF BRITISH CHAIN DRUG STORES.

Two chains of retail drug stores in the London district have been acquired by Taylors (Cash Chemists), London (Ltd.). The chains being acquired are Parkes Chemists (Ltd.), with 42 retail shops, and Mortons (Cash Chemists, Ltd.), with 22 shops.

It is understood that Taylors are already proprietors of the second largest drug store chain in Great Britain, the largest chain being Boots the Chemists, with probably close to 850 retail stores.

Chain store merchandizing is extending more or less rapidly in Great Britain, although probably less rapidly in the case of drug stores than for other retail establishments, largely for the reason that the drug store or chemist's shop in Great Britain still clings to its professional atmosphere and individualism. On the other hand, the selling of drugs and medicines in the chemist departments of general stores is a feature of chain store merchandising, which is sometimes overlooked. Many general stores or department stores operated on the chain store principle have chemists' and druggists' departments, as have also the large coöperative stores, several of which maintain a number of retail branches in different parts of the country. (Trade Commissioner Homer S. Fox, London.)

In this connection, attention is directed to the article appearing in Commerce Reports for January 7, entitled, "British Market for Prepared Medicines."

CHINESE MATERIA MEDICA.

In the light of modern science the old question of how they (Chinese inorganic and organic substances used in medicine) act is rather replaced by the question: Do they really act at all? If so, are they more efficient than drugs in present use? On the positive side, Portulaca has been shown to be of real value in certain forms of dermatitis, and a good case has been made out for the efficiency of kaolin in cholera, rice polishings for deficiency diseases, ephedrine for asthma, the seaweeds for iodine deficiency diseases, Yuoh Chip for coughs, and various forms of organic calcium as seen in deer horn and tiger bones have a rational basis. A scientific study of the old empirical medicine is far more than a possible channel for the vindication of their virtues; it is a source of hidden treasure, the discovery of which may lead to material progress. Some of the earliest immunity work was done with the toxalbumins isolated from *Abrus* and castor oil seeds, respectively, and the two alkaloids isolated from ma huang are of authenticated value in the study of the sympathetic and parasympathetic nervous systems. Hence, in research on Chinese materia medica, as in the field of pharmacology generally, the quest is not only for new therapeutic agents, but for the facts which form the foundation of all scientific truth.—B. E. Read and J. C. Liu (*National Medical Journal* of China, xiv, 5 (1928), 312; through *Ph. J. & Ph.* (March 16, 1929).

PEREGRINATIONS OF PHARMACEUTICAL PRODUCTS.*

BY ROBERT J. RUTH.

Most of us who were privileged to spend many hours daily breathing in the pungent atmosphere of the druggy drug store of two to three decades ago, when the Twentieth Century was still in its colicy days, can remember the "canning season."

Whole or ground pepper, cloves, cinnamon bark, nutmeg, mace, ginger root, mustard seed, dill, celery seed and allspice—all weighed out and wrapped in neat packages for the lady with the shopping list—hundreds, thousands, millions of packages of spices to be used in countless kitchens all over America, where hundreds, thousands, millions of cans and jars of fruit and vegetables were being "put up" for home consumption during the months intervening till nature would again afford these ripened foods.

The aromatic atmosphere of every community bore out the fact—indeed, you can still smell "canning season" in this sophisticated era of the Twentieth Century, but the spices don't come from the drug store.

What has become of this great volume of condiment business, which the retail drug stores enjoyed at "canning season" and which was supplemented by a steady if not so voluminous demand throughout the entire year?

Most of it has gone to the grocery store. Just when or how it went is difficult to define, but grocers began to sell attractive packages of ground spices, with sifter tops, convenient to use and convenient to purchase because they were well displayed—the pharmacist could not very well display a bulk stock of spices, so the grocer largely annexed this considerable condiment business which amounts to millions of dollars each year—spices ceased being drugs and became food products.

Perhaps it is just a natural evolutionary process, this migrating of the spice business—the fact remains that the housewife of to-day has pretty well forgotten that her mother had the habit of going to the drug store for spices.

Equally as sad to contemplate is the peregrination of the business, once enjoyed by the pharmacist, on olive oil, extract of vanilla, extract of lemon, beef cubes, meat juices, malt extract, ammonia water, chlorinated lime, borax and many other products once persistently purchased in drug stores and now almost entirely obtained from grocery stores, mail order houses and house to house vendors. The annual sales of olive oil in this country reach a stupendous figure. Pharmacists enjoy but an infinitesimal part of this business to-day.

Science has, through the discovery of vitamins, laid kindly hands upon an old medicinal product—one used since the Middle Ages—and elevated it to the position of one of the "best sellers" of all drug store products. Within the past decade the use of cod liver oil has increased in an almost unbelievable manner. If the rate of increase of cod liver oil consumption continues, it would seem that the product will cease to be a by-product of the cod fishing industry and become the major part of the business.

It is interesting to know that the United States consumes more than one-third of the world's supply of medicinal cod liver oil, which translated into cash receipts

* Section on Commercial Interests, A. PH. A., Portland meeting, 1928.

means millions of dollars in the cash registers of the drug stores of the nation every year.

The rancid odor and nauseating taste of old-fashioned cod liver oil have been eliminated by new scientific processes of refining in the manufacturing laboratory which have robbed the product of its late terrors and no longer need the child be bribed or threatened into taking this health-giving ambassador of "Sunshine from the Sea."

In March, when I was in Little Rock, where I lectured at the Medical School of the University of Arkansas, Dr. Vinsonhaler, the Dean, told me that there were many newly developed cases of pellagra following the Mississippi River flood disaster. The cause was, of course, the faulty and impaired diet of many of the flood victims. The treatment employed, Dr. Vinsonhaler said, was the administration of milk, eggs and cod liver oil, which brought about speedy recovery.

We know that cod liver oil is a specific in the treatment of rickets, and so we must consider it a medicinal product when so used and also when it is employed in the treatment of certain nutritional diseases. Just so must we consider milk and eggs in the category of medicinal agents when they are employed in the treatment of nutritional diseases—in other words, whenever they are used as medicines. We would not fail, however, to recognize milk and eggs primarily as food products, and so to-day we must consider cod liver oil a food product, for health authorities throughout the world recognize cod liver oil as an important food product necessary to the proper diet of the baby and growing child in building strong, sturdy bodies free from skeletal mal-formations.

Most of the cod liver oil consumed to-day is taken as a food product, supplementing the baby's milk or the regular diet of growing children and adults.

Will the grocery trade soon come to recognize the possibilities of the cod liver oil business? Will grocers stock and sell cod liver oil as they have olive oil and the spices? But wait—there is an important point which must not be overlooked. Cod liver oil may be a highly potent food or medicine, or it may be without appreciable merit as such. Scientists have not only discovered the vitamin A and D content of cod liver oil, but they have perfected methods for standardizing and protecting the vitamins.

The United States Government has realized the importance of protecting the public in the matter of cod liver oil, its preparations and concentrates, and has realized that a vitamin standard must be set for any product, upon the label of which the terms "cod liver oil" or "vitamin" are used.

It is important that retail druggists have a thorough knowledge of the production and refining of cod liver oil and the standardization and protection of its vitamin content and that they acquaint their patrons with the fact that only a reliable, standardized product should be used. If pharmacists will do this and prominently display cod liver oil in their windows and upon their counters, it will continue to be considered as a drug store product by the public and will not peregrinate to the grocer's shelves, the mail order house and the migratory vendor's wagon.

Make your preparations early for attending the Rapid City meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION.

DERMATOLOGICAL USE OF TITANIUM OXIDE.*

BY B. L. MEREDITH AND W. G. CHRISTIANSEN.

In a recent article by Metadier,[1] attention is again called to the therapeutic use of titanium compounds; Pick[2] in 1911 had conducted extensive experiments and had found them medicinally valuable. In Metadier's paper M. Delahaye is quoted as recommending the use of titanium oxide both as powder and as ointment in the treatment of skin diseases. Its action is said to be non-irritant, non-toxic, antiseptic, keratolytic, antipruriginous and keratoplastic.

It would seem, therefore, that titanium oxide in oitment form might well be expected to supplant zinc ointment. An investigation of this possibility has been made in these laboratories, using a sample of pure titanium oxide.

EXPERIMENTAL PART.

Prior to the use of the titanium oxide for the preparation of products to be tested for dermatological behavior, it was necessary to examine the purity of the oxide.

Purity of the Sample.—The usual $KHSO_4$ fusion failed repeatedly to dissolve the sample; and it was necessary to use hydrofluoric acid—the HF being subsequently expelled by evaporation with H_2SO_4. Qualitative tests were made for the heavy metals, which were found absent except for the slightest trace in the tin group. This was so faint that ultimate identification was scarcely possible and the sample was considered satisfactory for biological testing.

Test Preparations.—Two ointments were prepared containing 20% titanium oxide. The first (A) was made in the same manner as Zinc Ointment U. S. P. X, substituting titanium oxide for zinc oxide.

Ointment "A."	Gm.	*Ointment "B."*	Gm.
Paraffin	15	Paraffin	5
White Petrolatum	65	White Petrolatum	75
TiO_2	20	TiO_2	20

Due to the very bulky nature of the TiO_2 powder this preparation was considerably stiffer than the corresponding zinc ointment. A second (B) was prepared in which the paraffin was reduced:

DUSTING POWDER.

The original sample of TiO_2, being in the form of a very fine powder, was used as received.

BIOLOGICAL TESTS.

The two ointments and a sample of zinc oxide ointment were tested for their power to restrain the growth of bacteria using vaseline as a control; the method

* Scientific Section, A. PH. A., Portland meeting, 1928.

[1] *L'Union Pharm.*, 68 (1927), 129.

[2] J. Pick, *Med. Klin.*, 1270 (1911).

described by Dr. George F. Reddish, Bureau of Chemistry, Dept. of Agriculture was used. None of the three ointments exercised any restraining action different from that of the vaseline.

Scarified areas were treated by daily application of the titanium oxide and zinc oxide ointments and the titanium oxide dusting powder. In all cases the areas healed more rapidly than did control areas which were not treated. There was no observable difference between the ointments but all three of the latter were more effective than the powder.

None of these products caused any irritation when applied daily to the skin of normal rabbits for a period of fifteen days.

CONCLUSIONS.

There does not seem to be any significant difference between the action of zinc ointment and titanium oxide ointment under the conditions described above.

RESEARCH DEPARTMENT OF THE
CHEMICAL AND PHARMACEUTICAL LABORATORIES,
E. R. SQUIBB & SONS, BROOKLYN, N. Y.

THE PREPARATIONS OF PHENOLATED SOLUTION OF IODINE, N. F.*

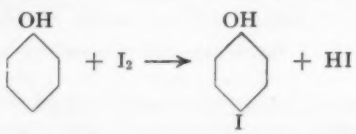
BY JOHN C. KRANTZ, JR., AND C. JELLEFF CARR.

The National Formulary directs the mixture of glycerin, compound solution of iodine, liquefied phenol and water, used in the preparation of Boulton's Solution, to be set aside in the sunlight until decolorized. The standard treatises on pharmacy say little about the nature of the reaction which occurs during the exposure to light, and the National Formulary fails to mention the type of color glass in which the exposure should be made to accomplish most quickly the desired results. One of the texts on pharmacy (1) states that "Phenol being an unsaturated body, absorbs the iodine even as benzene does, and the iodine compound is colorless."

It occurred to the authors that a study of the influence of various radiations upon the rate of reaction and also a chemical study of the nature of the reaction which takes place would be desirable.

THE NATURE OF THE REACTION.

Samples of the solution prepared, omitting the liquefied phenol, did not lose their iodine color when heated to 50° C. for twenty-four hours, indicating the cause of decolorization to be the reaction between the phenol and iodine. The three mono iodo-phenols, ortho, meta and para, are recorded in the literature and, in general, are prepared by treating phenol with iodine in the presence of an oxidizing agent, such as nitric acid and iodic acid (2), these substances prevent the reversibility of the following reaction by decomposing the hydriodic acid.

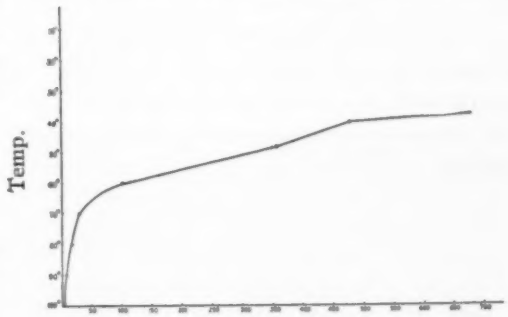


* Section on Practical Pharmacy and Dispensing, A. PH. A., Portland meeting, 1928.

The properties of the ortho and para compounds are recorded by Nolting and Stricker (3).

In the opinion of the authors, this reaction is the one which takes place in the preparation of Boulton's Solution, namely, iodine enters the benzene ring replacing hydrogen, which is split off as hydriodic acid and the absorption of iodine does not occur. In support of this view of the nature of the reaction, a sample of Boulton's Solution was prepared and before decolorizing the hydrogen-ion concentration of the solution was measured electrometrically. The p_H before decolorization was between 5 and 6, after decolorization the p_H dropped to 2.2, indicating the formation of a strongly ionized acid, presumably hydriodic acid. Assuming that the foregoing reaction occurs, 1.88 mg. of hydrogen iodide should be formed when 5 cc. of this solution is decolorized. An analysis of the product by the Volhard Silver Method (making the necessary corrections for the potassium iodide present in the Lugol's Solution) showed 1.76 mg. of hydrogen iodide in 5 cc.

It is interesting to note that the reaction proceeds more rapidly in partially filled bottles (liberal supply of oxygen) than in completely filled bottles. A small quantity of hydrogen peroxide solution will decolorize the solution in a short period of time. Exposure to air and hydrogen peroxide reduce the tendency to reversibility of the reaction, as suggested in the foregoing discussion.



Graph 1.—Influence of temperature upon velocity of reaction.

INFLUENCE OF HEAT UPON THE REACTION.

The reaction between iodine and phenol is greatly accelerated by gentle heat, and can be greatly retarded even in direct sunlight when the temperature is sufficiently reduced. The reaction period for decolorization of 100 cc. of this solution is 4 minutes at 100° C. and 432 hours at 20° C. when exposed to diffused sunlight. From 70° to 100° C., the rate of reaction follows closely the principle of Van't Hoff (4), *i. e.*, a rise in temperature of 10° C. doubles the speed of a chemical reaction. The results of these experiments from 10° to 100° C. may be observed from Graph 1.

INFLUENCE OF THE COLOR OF THE GLASS CONTAINER.

In order to study the influence of the color of the glass container in which the exposure is made upon the velocity of the reaction, samples were exposed to sunlight (direct and diffused). The exposures were made in colorless pyrex and quartz tubes; to produce the colors, the tubes were covered with one thickness of "Cellophane" of the desired color. The quantities of iodine remaining in 5 cc. of the solution were titrated after different time periods with $N/1000$ sodium thiosulphate solution.

Table I shows these results in pyrex and Table II in quartz tubes.

TABLE I.

Exposure in pyrex tubes—5 cc. of Boulton's Solution contains 1.39×10^{-3} Gm. I_2.

	Grams I_2 after 24 hours.	Grams I_2 after 72 hours.
Plain	9.52×10^{-4}	2.79×10^{-4}
Green	9.02×10^{-4}	3.05×10^{-4}
Purple	9.14×10^{-4}	4.44×10^{-4}
Yellow	1.17×10^{-3}	6.35×10^{-4}
Red	1.17×10^{-3}	6.35×10^{-4}

TABLE II.

Exposure in quartz tubes—5 cc. of Boulton's Solution contains 1.39×10^{-3} Gm. I_2.

	Grams I_2 after 24 hours.	Grams I_2 after 72 hours.
Plain	9.9×10^{-4}	3.17×10^{-4}
Green	9.4×10^{-4}	3.56×10^{-4}
Purple	8.89×10^{-4}	3.17×10^{-4}
Yellow	9.52×10^{-4}	3.81×10^{-4}
Red	9.52×10^{-4}	3.8×10^{-4}

EFFECT OF ULTRAVIOLET RADIATION.

In order to study the influence of ultraviolet radiation upon the velocity of the reaction several quartz tubes were filled with Boulton's Solution, and exposed to ultraviolet radiation from a Hanovia Alpine Sun Lamp for one-half hour. Table III records the amounts of iodine present after 24 hours after the ultraviolet exposure.

TABLE III.

Exposure to Ultraviolet Radiation—5 cc. of Boulton's Solution contained 1.27×10^{-3} Gm. I_2.

Plain (irradiated half-hour)	5.46×10^{-4}
Plain (not irradiated)	5.72×10^{-4}
Purple	6.54×10^{-4}
Green	5.4×10^{-4}
Plain (in dark at 48° C.)	Iodine free

A summary of the experiments upon exposure of the reaction mixture to radiations of various wave-lengths indicates that reaction proceeds in pyrex more rapidly in plain, green or purple glass. Yellow and red glass containers retard the velocity of the reaction. In quartz tubes purple allows the reaction to proceed most rapidly, whereas, again, yellow and red are undesirable. A comparison of Tables II and III indicates that the ultraviolet radiation hastens the speed of the reaction, although the rate of increase is not marked.

BACTERIOLOGICAL EXAMINATION.

Boulton's Solution was submitted to the Department of Bacteriology of the School of Hygiene of the Johns Hopkins University for the purpose of having its phenol coefficient determined. Two samples were reported as having a phenol coefficient too low for measurement. This is in accordance with the statement of Wood and LaWall (5) who claim that the reaction between iodine and phenol reduces the therapeutic value of the two substances.

CONCLUSIONS.

1.—The nature of the reaction between iodine and phenol in Boulton's Solution has been studied and shown to be a substitution reaction.

2.—The influence of temperature and various radiations upon the velocity of the reaction have been determined.

3.—A bacteriological examination of the solution has been made.

REFERENCES.

(1) H. V. Arny, "Principles of Pharmacy," page 688.
(2) Labanoff, B.6 (1873), 1251.
(3) Nolting and Stricker, B.20 (1887), 3018.
(4) "Vorlesungen über Theoretische und Physikalische Chemie," I, 223.
(5) Wood and LaWall, "U. S. Dispensatory," page 1670.

PHARMACEUTICAL RESEARCH LABORATORY,
SHARP & DOHME.

GROUP OF MILITARY PHARMACISTS AT INTERNATIONAL CONGRESS IN LONDON.

Group of Army Pharmacists taken May 17th, on the occasion of the International Congress of Military Medicine and Pharmacy, near Headquarters of British Pharmaceutical Society; President Herbert Skinner is in the center of the front row.—We are indebted to Editor G. P. Forrester, of the *Chemist & Druggist*, for the photograph.

AMERICAN PHARMACEUTICAL ASSOCIATION MEMBERSHIPS AS PRIZES BY COLLEGES OF PHARMACY.

Quite a number of the Colleges of Pharmacy offer memberships in the AMERICAN PHARMACEUTICAL ASSOCIATION as prizes. We have been advised by some of the institutions and, as far as we have the information, the list will be printed in the July JOURNAL. Grateful acknowledgment is made of programs and invitations, of and to Commencement Exercises of schools and colleges of pharmacy. All of these institutions have had average graduating classes, in a few instances larger than heretofore, and some have had only very few graduates on account of lengthening the courses.

Alumni Associations are growing, the members are taking a deeper interest in the institutions from which they received their credentials. Pharmacy will benefit according to the interest which alumni exhibit for their respective *Alma Maters*.

We will appreciate a list of A. PH. A. membership awards from all schools and colleges of pharmacy.

THE DEPARTMENT OF THE NATIONAL ASSOCIATION OF BOARDS OF PHARMACY

H. M. Lerou, President, Norwich, Conn. J. W. Gayle, Treasurer, Frankfort, Ky. M. N. Ford, Chairman of Executive Committee, Columbus, Ohio. H. C. Christensen, Secretary, 130 N. Wells St., Chicago, Ill.

ACTIVE MEMBER STATES.

Alabama	Indiana	Montana	Rhode Island
Alaska	Iowa	Nebraska	South Carolina
Arizona	Kansas	Nevada	South Dakota
Arkansas	Kentucky	New Hampshire	Tennessee
Colorado	Louisiana	New Jersey	Texas
Connecticut	Maine	New Mexico	Utah
Delaware	Maryland	North Carolina	Vermont
D. of Columbia	Massachusetts	North Dakota	Virginia
Florida	Michigan	Ohio	Washington
Georgia	Minnesota	Oklahoma	West Virginia
Idaho	Mississippi	Oregon	Wisconsin
Illinois	Missouri	Pennsylvania	Wyoming

THE COMING CONVENTION.

The twenty-sixth annual convention of the National Association of Boards of Pharmacy will be held Monday and Tuesday, August 26th and 27th, at the Alex Johnson Hotel, Rapid City, South Dakota. As the convention of the AMERICAN PHARMACEUTICAL ASSOCIATION immediately follows, there is the added advantage of attending these meetings and festivities.

The first N. A. B. P. session will convene on Monday morning at 9:30, followed by an afternoon session the same day and probably a banquet in the evening. Tuesday morning is being kept free for a sightseeing trip through Rapid Canyon, which is being arranged by the Local Committee for Board and college delegates. The joint session of the Boards and the colleges will therefore be held on Tuesday afternoon, instead of Tuesday morning as heretofore, and the final N. A. B. P. session, with election of officers, on Tuesday evening.

It is urged that all who are planning to attend make early reservations, especially if they desire to stop at the Alex Johnson Hotel, as accommodations are limited there. Please make reservations through F. W. Brown, Local Chairman, Lead, South Dakota, or the hotel direct. The Harney Hotel, Rapid City, is also recommended.

There are several very important decisions which N. A. B. P. delegates will be called upon to make. The plan for extension study for Board members as proposed by Robert L. Swain, of Maryland, last year will be submitted for discussion and approval. If adopted, it will provide Board members with a means of keeping abreast of the times in the latest findings of science having a bearing on pharmacy by means of articles, book reviews and suggested reading. As most Board members have been in business for a considerable number of years since graduation, this is an important work in order to keep our Board examinations in line with the times.

The Study of Pharmacy, or the Survey Committee, will also have an important report to deliver.

The Advisory Examination Committee will report on specific recommendations as to the content of examination papers, in accordance with resolutions submitted last year. One of these resolutions provided that the minimum grade in practical work (actual compounding) be made 75 instead of 60 as heretofore and, if adopted, will require an amendment to the by-laws.

The unconstitutionality of the Pennsylvania ownership law as decided by the United States Supreme Court will be discussed. Other methods of accomplishing the same result will be presented. Have you any suggestions?

The anglers, of whom we have a goodly number in the N. A. B. P., will remember that this region was Ex-President Coolidge's favorite fishing ground and come prepared to spend a week or so vacationing after the conventions. (This ought to insure 100% representation from the Alabama Board.) Other possibilities are tours of the Black Hills, Custer State Park, dude ranches, Hot Springs, the Indian reservations, polo, golf, country clubs—all this in one trip. Make your reservation to-day!

Credentials will be mailed to secretaries later and further information will also be sent to all Board members.—H. C. C.

PORTO RICO APPLIES FOR N. A. B. P. MEMBERSHIP.

The central office is glad to announce the good news that after two years of correspondence and preliminary work, an application for membership has been received from the Board of Pharmacy of Porto Rico. All the requirements have been met, in fact the pharmacy law was amended to permit affiliation with the N. A. B. P. and carrying out of its rules and regulations.

The application will be presented to the Executive Committee for acceptance at its next meeting, just prior to the Rapid City convention. Official notification will be sent to all member Boards at that time. In the meantime, the central office will take care of all applications in the usual manner.

Porto Rico examines in the five required subjects and the educational requirements for entrance to examination are graduation from high school and three-year course in a college of pharmacy. Since the school of pharmacy of the University of Porto Rico is a member of the A. A. C. P., there will be no difficulties concerning recognition of the college.

The members of the Porto Rico Board are as follows: President, Carlos A. del Rosario; Secretary, Carlos Garcia de Quevedo; Treasurer, Ramon L. Daubon; Luis E. Remus and Luis G. Hernandez, members. The Secretary's address is 3 Allen Street, Box 804, San Juan. Congratulatory messages are entirely in order.—H. C. C.

OBITUARY.

H. L. HAUSSAMEN, 1859–1929.

H. L. Haussamen, president of the North Dakota Board of Pharmacy, died at his home in Grafton, North Dakota, on May 8, 1929. He had recovered suffi-

ciently from the stroke he suffered some months ago to make a trip to his store daily, but he was stricken a second time and did not regain consciousness.

The N. A. B. P. feels a distinct loss in the death of Mr. Haussamen—he leaves a place that no one else can fill. He was one of the early organizers of the Association and has maintained a very active part in all its work, attending conventions regularly. Only a day or two before he died, he had penned a newsy letter to the central office telling how much better he felt and complaining that the doctor would not let him do enough. His energy was boundless.

H. L. Haussamen was born in Ontario, Canada in 1859. He was graduated from the Ontario College of Pharmacy and, at the time of his registration as a pharmacist in the Northern District of the territory of Dakota in May 1887, he had spent twelve years in the business in Ontario, Brooklyn, New York City, Grafton and Park River, Dakota. He was a charter member of the North Dakota Pharmaceutical Association, which he helped organize in 1886 and served as its first secretary, until 1890.

He took the initiative in securing the first pharmacy legislation which was passed in Dakota Territory on March 11, 1887, and was chosen by the Governor of the territory as a member of the first Board of Pharmacy under that law. Until 1890, he continued as president of the Board, when he resigned and took up residence in Costa Rica, entering the drug business there.

Upon his return to Grafton in 1893, he was again appointed to the Board of Pharmacy, and from 1895 until his death served as its president. This record of thirty-nine years of service on a Board of Pharmacy is undoubtedly the longest in the country.

He was a member of the Blue Lodge and York Rite bodies of Grafton; and Kem Temple Shrine at Grand Forks, North Dakota.

Like his family, his Board member friends mourn his passing. Pharmacy was his chief interest and he was always actively identified with every move for its advancement. He earned the praise, "Well done, thou good and faithful servant."—H. C. C.

GENERAL NEWS.

Herbert M. Lerou, president of the N. A. B. P., discussed the proposed four-year pharmacy course and the college prerequisite before the meeting of the Massachusetts Pharmaceutical Association at Swampscott on June 11th to 13th.

Joe Demain has been busy having honors thrust upon him since his retirement from the Kansas Board of Pharmacy. The natives of his home town decided that he would make a good mayor for Macksville, put his name on the ticket, and when the ballots were counted, he had received 139 votes, his opponent getting 116. His salary will be the princely sum of $1.00 a year, and it is therefore assumed that he will not sell his pharmacy but will remain a member of the profession. Also, on April 23rd, he was made president of the Kansas Rexall Club, without any contestants for the office. He was also made second vice-president of the Kansas Pharmaceutical Association at Topeka, in April.

United States Civil Service examination for Junior Pharmacologist will be given some time in July. All applications must be filed with the U. S. Civil Service Commission in Washington, D. C. on or before June 25, 1929. The salary for this position is $2200 per year. Blanks can be secured from the same source. The examination will be conducted at specified points in each state.

The sympathy of all N. A. B. P. friends is extended to **F. H. King** of Delphos, veteran member of the Ohio Board, whose son, George King, was suddenly striken with heart attack on May 22nd and died immediately. The young man was a graduate of Notre Dame College of Pharmacy '26, and was in the employ of Parke Davis & Co. with headquarters at Johnstown, Pa. On September 22, 1928 he had married a Delphos girl, Miss Veronica Hessian. The deceased young man is survived by his widow, his parents, one brother—Carl King, member of the local drug firm of King, William & King, and three sisters—Sister Mary Edith, Notre Dame, Ind., Sister Mary Joan, Fremont, Ohio, and Mrs. Walter Remlinger of Delphos.

STATE BOARD NEWS.

Alabama.—J. F. Spearman, state narcotic and drug store inspector, is rounding out a year of valuable service. He has visited over 600 drug stores in the state. Eight convictions on pharmacy law violations have been made and more are to follow.

Reciprocal registration has been granted during May to the following: Henry G. McArthur, of Florida, Joe W. Bagwell, of Georgia, Howard M. Boyd and Rodney A. Barb, both of Tennessee.

Alaska.—Reciprocal registration was granted to Donald H. Campbell, of Washington.

Georgia.—Upon recommendation of the state Board of Pharmacy, a resolution was presented at the meeting of the Georgia Pharmaceutical Association held at Valdosta, on April 17th and 19th, authorizing the legislative committee and the state Board of Pharmacy to prepare an amendment to the pharmacy law to be introduced in the legislature at its next session. The amendment will provide that all candidates for license as registered pharmacist must be graduates of a College of Pharmacy recognized by the Board.

The following were registered by reciprocity recently: Fay F. Feogin and Frank M. Holcomb, both of Alabama.

Illinois.—Reciprocal registration was granted to the following at the quarterly meeting of the Board: V. A. Monast, of Connecticut; Wm. H. Davis, of Georgia; Joseph L. Borycsko, George E. Meyer, Harold J. Lewis, Paul Hoover, Thurman D. Lewis, Anthony G. J. Maecher and Irene J. Ostrowski, all of Indiana; Solomon Freedman, Virgil Gibson, A. M. Harder, Thilo G. Knappa, Clayton O. Meyer, Roy R. Wilson and Ruth A. Spry, all of Iowa; Harlow W. Brown, of Michigan; Sigrid M. Schold of Minnesota; James H. Hicks and Noah Nunley, both of Missouri; Frank M. Schmieg of Montana; William J. Macnab and E. N. Oberlin, both of Ohio; Archie B. Wilkinson, of Oklahoma; Melvin L. Berger and James S. Strawn of Pennsylvania; McLean J. Morrison and Moses B. McIntyre, of Tennessee; Walter A. Bergquist, of Wisconsin.

Indiana.—Reciprocal registration was granted during May to Cornelia Cunningham of Georgia.

Kansas.—Reciprocity has been extended to Bob Scott and Alexander F. Buckley, both of Oklahoma.

Maryland.—Reciprocal registration was granted to the following during May: Ralph E. Burkholder, of Georgia; Warren P. Eldridge, of Maine; Harry L. Hoffman, of New Jersey; George Rolland Fitez, of West Virginia.

Massachusetts.—Out of a class of fifty-eight candidates examined on April 23rd, twenty have been granted licenses as pharmacists. The following were recently registered by reciprocity: Raymond P. Chamberlain and Michael J. Bowen, of Maine; Maurice J. Savard, of Rhode Island.

Minnesota.—The state association has recommended the following five nominees, from which the Governor is to select one for the next vacancy on the Board of Pharmacy: J. P. Jelinek and C. T. Heller, both of St. Paul; F. W. Moudry, of Minneapolis; A. L. Malmo, of Duluth; and N. V. Sanders of Albert Lea. This is for the term of J. P. Jelinek which expires soon, and it will be noted that he is mentioned in the list.

Missouri.—The following were registered by reciprocity during May: Irving Slocum, of Kansas; Arthur F. Schlichting, of Michigan; E. A. Daniels, of Oklahoma (formerly a member of the Oklahoma Board, by virtue of honorary certificate); and Sister Mary Regina, of Wisconsin.

Montana.—Reciprocal registration was granted on May 27th to Edward Lieurance of Kansas and Elmer Highley, of Wyoming.

New Jersey.—The Board of Trustees of the New Jersey Pharmaceutical Association passed the following resolution covering the services of William H. McNeill, retiring member of the New Jersey Board of Pharmacy:

"Resolved, That the New Jersey Pharmaceutical Association record its appreciation of the faithful service which William H. McNeill has given the people of the State of New Jersey as well as the pharmacists of this State as a member of the Board of Pharmacy for the past twelve years, and that a copy of this resolution be presented to Mr. McNeill and spread upon the minutes of the annual convention."

Reciprocal registration was recently granted to the following, all Pennsylvania licensees: Nathan Rothman, Placido Venuto, David Berger and Harry Kimmelman.

New Mexico.—The spring examination was held in the Franciscan Hotel, Albuquerque, May 20th. Results are not yet available.

North Carolina.—Reciprocal registration was granted to the following recently: Charles M. Cain, George A. Cowan, Robert M. Prince and Clarence L. Thomas, all of South Carolina; and Carl P. Grimstead, of West Virginia.

Ohio.—Thirty-two of the sixty-seven candidates taking examination in Columbus on April 2nd and 3rd have been registered as pharmacists. Fifteen of the twenty-four taking the assistant examination were also successful in passing.

The highest grade made in the pharmacist examination was 86% by three applicants, William E. Moody, of Cleveland, Sol K. Snyder, of Cincinnati, and Meyer Selzman, of Cleveland. The highest grade made in the assistant examination was 90% by William E. Fitzpatrick, of Bellefontaine.

Reciprocal registration was granted to Fred G. Warren on the basis of West Virginia license.

The June examination was held at Columbus on Tuesday, the 18th. It was the last examination held for "assistant pharmacists." House Bill 236 passed by the Legislature and signed by the Governor eliminates the examination of "assistant pharmacists" and raises the fee for the "pharmacist" examination from twenty to twenty-five dollars, becoming effective July 26, 1929.

Oklahoma.—Clarence M. Anderson, secretary of the Oklahoma Board recently received a vote of thanks from the motorists of the state when he had J. H. Rundell of Mulhall arrested, making him spend a night in jail and pay a fine of $25.00 for dispensing prescriptions without being registered under the Oklahoma law. Rundell as Justice of the Peace has been enforcing a fifteen mile an hour speed limit in Mulhall and collecting a profitable fee from each arrest, and many unsuspecting motorists had been made to pay toll. He has come to have a state wide notoriety for this sort of thing among the Oklahoma motorists and all were glad to find him getting a dose of his own medicine.

Oregon.—The Oregon Board of Pharmacy held an examination meeting beginning Tuesday, June 4th. The meeting lasted three days and was held simultaneously in Corvallis and Portland, three members being stationed at the former and two at the latter place.

Pennsylvania.—Examinations were conducted by the Pennsylvania Board of Pharmacy on April 11th, 12th and 13th, at the Philadelphia and the Pittsburgh Colleges of Pharmacy. Out of 79 candidates for pharmacist registration, thirty-six were successful; out of 198 applicants for "assistant" registration, 131 were successful.

Charles B. Larsen, of Nebraska was granted registration by reciprocity.

South Dakota.—The regular meeting of the Board was held at the Division of Pharmacy, Brookings, May 27th and 28th.

Tennessee.—The following applications for reciprocity were recently accepted: James C. Donathan, of Arkansas; C. W. Royster, of Kentucky; and Thomas L. Graves, of Mississippi.

Texas.—Reciprocal registration was granted during May to the following: John D. Bradford, Dwight N. Bowles and Roy Eubanks, all of Arkansas; Roy R. George and James O. Curtis, both of Georgia; Daniel W. Houser and Leo J. Snyder, both of Kansas; and Allen E. Greer, of Louisiana.

Virginia.—The Board of Pharmacy of Virginia held its regular annual meeting in Richmond on April 23, 1929. Officers elected for the ensuing year are: **President,** W. L. Lyle, of Bedford; **Vice-President,** H. C. Littlejohn, of Leesburg; **Secretary-Treasurer,** A. L. I. Winne, of Richmond.

An examination meeting was held in Richmond, June 4th and 5th. Results not available at time of going to press.

H. C. Littlejohn, of Leesburg, has been reappointed as a member of the Board of Pharmacy for a term of five years from March 1, 1929. Mr. Littlejohn has served one full term and part of another term on the Board, and has been its vice-president for the past seven years.

West Virginia.—The following were registered by reciprocity recently: Columbus Talbott, of New Mexico; James T. Fuqua and Charles H. Adams, both of Virginia.

Wyoming.—Governor Emerson recently appointed C. C. Earl, of Lander as a member of the Board of Pharmacy to succeed C. C. Tomsik, of Sheridan, whose term recently expired.

The law was amended at the recent legislature to permit the Board to retain fees collected for examination, reciprocity, renewals, etc., paying its expenses out of these funds. Heretofore the Board has had an appropriation usually about $2500 for a two-year period and this has not been sufficient. Examination fee was also increased to $15.00, reciprocity fee to $25.00 and annual renewal to $4.00. Also, the provision of the law was deleted which relates to returning the fee in case of failure of the applicant. Under this section about three-quarters of all fees were returned, in spite of the fact that the Board had done the work.

Reciprocal registration was extended to Karl F. Moedl, of Utah, during May.

THE TEACHING OF BOTANICAL SUBJECTS AT THE NEW YORK COLLEGE OF PHARMACY.*

BY C. W. BALLARD.[1]

The numerous articles and discussions dealing with the teaching of botany and pharmacognosy indicate a lack of unanimity as to scope and methods of presentation. While not quite agreeing that such unanimity is an indication of perfection, the fact remains that the teaching of these branches in the different pharmacy schools shows great variation as compared with pharmacy and chemistry. There even occasionally crops up the question as to why they should be taught. A certain amount of standardization is greatly to be desired, especially by those schools which receive students from other institutions, but this should be a standardization as regards scope. This is very aptly put in an article by Professor Youngken[2] in which he states his belief that there should be a minimum list of topics included in the botanical course, but that the teacher should be given the broadest latitude in the matter of presentation. If, as he states, we have such a minimum list of topics in the Pharmaceutical Syllabus and the Commonwealth Study and if those teaching these subjects are willing to include these topics in their courses, we at once have an agreement as to scope. But the very fact that each school is at liberty to omit a certain amount of this material at once partially nullifies efforts toward uniformity of scope. It appears desirable if we are to secure uniformity, to either make the Syllabus list obligatory or establish a list of obligatory topics with a proviso that they must be included in the work of each school.

Perhaps the first step toward a crystallization of ideas as to scope and uniformity or conformity with both Syllabus and Commonwealth Study, should be definite statements from those teaching these studies in the various schools. Such a statement should not only include the apportionment of hours, but also general data as to arrangement of work, mechanism of the laboratory, sequence of topics, examinations or tests and computation of standings. The recent article by Pro-

* Section on Education and Legislation, A. PH. A., Portland meeting, 1928.

[1] Associate Professor of Materia Medica, Columbia University, College of Pharmacy.

[2] Heber W. Youngken, "Teaching of Botany to Pharmaceutical Students," JOUR. A. PH. A., 11 (1928), 190.

fessor Wirth[1] may well serve as an example. While most of those who have expressed opinions are in favor of greater uniformity as regards scope, it is especially pleasing that they are unanimous in the matter of latitude in the manner of presentation. The real differences of opinion arise in regard to the sequence of topics in a given subject. These differences even exist between schools in close proximity and the conferences on laboratory teaching in New York State held under the auspices of the State Education Department go a long way toward agreement in the matter of scope and sequence in the five schools of this state. These conferences are so arranged that each third year those in charge of laboratory courses in the division of Materia Medica can meet, compare notes and come to that degree of agreement necessitated by the licensing examinations. The divisions of Pharmacy and Chemistry are afforded like opportunities and their conferences are held, one in each of the two intervening years.

The following brief descriptions of the laboratory procedures in botany and pharmacognosy at this school are presented in the hope that others may see fit to give similar statements. While these procedures have shown satisfactory results over a period of years, each term sees minor changes or experiments looking toward improvement. Therefore no claims of perfection are made and they are to be regarded as our contribution to what might be made a real symposium on the teaching of botany and pharmacognosy with all of the schools in the country taking part. If it were possible for each teacher to have before him a brief outline of the work at the other schools we would have something more tangible and more readily assimilable than the discussions at conferences, helpful as the latter may be.

APPORTIONMENT OF HOURS.

Ph.G. Course—First Year	
Lectures, Morphology	= 32 hours—1 hour for 32 weeks
Histology	= 24 hours—1 hour for 24 weeks
Recitations	= 40 hours—1 hour for 24 weeks 2 hours for 8 weeks
Laboratory Morphology	= 64 hours—2 hours for 32 weeks
Histology	= 64 hours—2 hours for 32 weeks
Second Year	
Laboratory Pharmacognosy	
Macroscopic	= 48 hours—1½ hours for 32 weeks
Microscopic	= 48 hours—1½ hours for 32 weeks
Ph.Ch. Course—First Year	
Lectures, Morphology	= 32 hours—1 hour for 32 weeks
Histology	= 28 hours—1 hour for 28 weeks
Recitations	= 40 hours—1 hour for 24 weeks 2 hours for 8 weeks
Laboratory Morphology	= 48 hours—2 hours for 24 weeks
Histology	= 96 hours—3 hours for 32 weeks
Second Year	
Laboratory Macroscopic Pharmacognosy	= 64 hours—2 hours for 32 weeks
Third Year—	
Laboratory Microscopic Pharmacognosy	= 64 hours—2 hours for 32 weeks

[1] E. H. Wirth, "The Teaching of Pharmacognosy," JOUR. A. PH. A., 17 (1928), 691.

BOTANY LABORATORY.

The work of the first year consists of lectures and recitations in morphology and histology together with laboratory work illustrative of these lectures. The laboratory work is divided between gross botany or morphology and histology so that each is given a two-hour period, histology in the morning and immediately following a lecture in the subject, and morphology in the afternoon of the same day. This arrangement is found to be more satisfactory than a continuous four-hour period. In morphology the work is divided into general and special topics, the latter series particularly related to descriptive terms used in reference to crude drugs. The sequence of general topics is the phyton, floral branch, perigone, androecium, gynaecium, torus, ovules, seeds and fruits. The special topics include the morphological examination of roots, rhizomes, stems, barks, leaves, fruits and seeds. Each of these topics extends over one or more two-hour periods. In regard to general topics the work parallels the general histology of plant tissues. Histology starts with the preparation of specimens and cell structure, works through the different types of tissues and closes with a consideration of the structural characters of each of the plant organs. Thus plant tissues are dealt with both as isolated elements and as integral parts of a given plant organ. In the latter part of this work the histology and morphology parallel each other. Thus while barks are being dealt with from the standpoint of the histology at a given morning period, their morphological characters and the terms used in their description are being covered in the afternoon period. In this way we secure coördination between the two lines of work; but as a greater amount of time is necessary for the histological study of a given specimen, the number so considered must be restricted. In morphology the student deals with commercial samples of drugs, and several drugs can be studied at each period.

Each student prepares a set of specimens, including powdered and sectioned materials, at the beginning of the year. The majority of the sections are cut by our staff and mounted by tne student in glycerin jelly. In addition to the set so prepared, he is also required to prepare a few specimens from both fresh and dried materials by sectioning, teasing or powdering, accordng to the nature of the specimen. Giving students prepared material may be open to objection, but often the time necessary for the student to prepare all of his specimens might better be given to an actual study of them.

For the past few years we have been using a laboratory manual devised by Prof. Hart and myself, and furnished the students in loose-leaf mimeographed form with a strong spring back binder. These manuals consist of a certain number of text pages summarizing the chief points relating to a given part of the work, together with a number of drawing or report pages. Readings are assigned weekly in advance and the pages for drawings are given to the students at the beginning of each laboratory period, so as to discourage the practice of submitting excellent drawings copied from some textbook. Minute directions for work are a part of the drawing pages and there is an almost endless repetition of the word *focus* so as to drive home the importance of proper manipulation of the microscope. We insist that the working directions be read perhaps several times over, and enforce this rule by not giving assistance if we see that the trouble is due to disregard of this request. We have found that if the student follows directions he will have a

fairly clear idea of procedure and will be able to do the work with but little trouble. The drawings or reports of each session are enclosed in a temporary binder and given in for rating and criticism at the end of the period. The matter of grading drawings is somewhat simplified by having but two grades—accept or reject for those drawings counting less than three points. The values assigned to accepted drawings or reports range from one point for those of a simple nature to eight points for detailed section drawings. The total number of credits for this part of the work is 125 in histology and 125 in morphology.

Four practical tests are held through the year for the first-year class. These consist of a certain number of prepared slides for microscopic examination and a like number of gross specimens for description or observation. In these tests the student is asked specific questions which can only be answered by an examination of the specimens assigned him. He is solely concerned with the identification of cellular elements, cell contents and morphological description.

Our main laboratory has a capacity of 135 students with work tables so arranged that north light is used for work. Each place is also provided with a substage lamp for use when daylight is not available. In addition to charts of our own preparation we use lantern slides, opaque and micro-projection in illustrating the work. Every student is furnished with a Bausch & Lomb Model FFS or Leitz Model III, compound microscope. Our equipment includes 172 instruments of these types beside 60 older models which are rented to students at a nominal fee. The two types of microscopes mentioned above are nearly uniform, so that each student has the same type both as regards mechanical details and optical equipment. For gross work we use a Barnes type dissecting stand of special design made to our order and with a reflecting mirror. The student furnishes slides, coverslips, slide box and dissecting instruments. The microscopes, both compound and dissecting, are drawn at the beginning of the period from two stockrooms upon presentation of a card bearing the number of the instrument assigned the student.

While our laboratory sections are very large, this difficulty is overcome by dividing each section into small groups, each in charge of and for which an individual instructor is responsible. There are always one or more members of the staff in general charge and their duty is to explain details or difficulties reported by the instructors in charge of the smaller groups. The instructors circulate among the students of their respective groups, giving assistance and commenting upon the work. As the laboratory staff includes three officers of professorial rank and six instructors, both classes being full-time appointees, we can so divide our laboratory sections that each instructor has between twenty and twenty-five students in his charge. Two laboratory helpers and one clerk are also included in the staff.

PHARMACOGNOSY LABORATORY.

The pharmacognosy of the second year includes both macroscopic and microscopic work. In the macroscopic division we arrange the official drugs according to the plant parts which they represent. The sequence is roots, roots and rhizomes, rhizomes, barks, woods, leaves, flowers, herbs, fruits, seeds, and a miscellaneous group containing articles not otherwise placed. Each student receives weekly a specimen box containing about ten crude specimens and during the term covers the

entire list of official drugs. He makes brief descriptions and sketches of each drug on a manual page which is divided and captioned for the purpose. He retains the specimens for his personal collection and turns in his descriptions for criticism. In this work the instructor is relieved of the routine presentation of titles, definitions and specifications for each drug as this material is printed upon the page of the laboratory book. He therefore has more time available for comment upon and explanations of this data. He indicates the specific points to be stressed in description but takes care not to carry this so far as to relieve the student of the necessity for personal observation. Four practical tests, each consisting in the identification of twenty drugs, are held during the year, and two theoretical tests are given. No direct grades are given for the descriptions and drawings in macroscopic pharmacognosy, but failure to present a satisfactory laboratory book both as to amount and scope is penalized by a deduction of twenty points from the rating of the next practical examination.

The microscopic pharmacognosy consists in the study and drawing of about fifty official powdered drugs. This work is so arranged that one or more of the drugs furnished as a specimen in macroscopic pharmacognosy of a given period is used for microscopic study. The student prepares a teased or powdered specimen from the crude drug, studies it and records his observations by sketch. Before each practical examination he is given an opportunity of obtaining standard powders from our stock for permanent preparations. The drawings of each session must be returned at the end of that period and grading is either "accept or reject." Four practical and two theoretical examinations are given during the course. The practical examinations consist of the identification of unknowns and the examination of known materials for conformity with official specifications. Students are required to use both the U. S. Pharmacopœia and National Formulary in these practical examinations.

PHARMACEUTICAL CHEMIST COURSE.

The general foundation work of this class is similar to that of the Ph.G. course in the first year, with the exception that twelve weeks are devoted to a brief but systematic study of the lower plant forms. This latter work replaces the morphological and histological study of plant organs given in the Ph.G. course. The general topics in both histology and morphology are the same for both classes. The study of lower forms begins with the *Cyanophyceæ* and works through *Algae*, *Fungi*, *Bryophytes* and *Pteridophytes*, concluding with a study of the general structure of the dicotyledonous plant. This is a broader treatment of botany than the more specialized Ph.G. course and is more in line with a general laboratory course in the subject.

Macroscopic pharmacognosy is placed in the second year of this course, and at this point the student receives instruction in the special morphology of parts of the plant constituting official drugs. This morphology is so worked into the program that one or more periods are given to the general consideration and description of a given plant part immediately preceding detailed studies of the drugs derived from this particular plant part. The method of presentation is similar to that of the Ph.G. course, but in addition to the official drugs, several nonofficial items of commercial importance are included.

The microscopic division of pharmacognosy is given during the third year and consists in a study of the histological structure of the several plant organs, followed by work on powdered drug materials. Students prepare their own specimens, both sections and powders, but are also given duplicate specimens from our stock after they have made a study of the materials prepared by themselves. Each student has a small reagent set and performs the simpler microchemical tests. They are also required to prepare two specimens by the paraffin infiltration method, carrying through all steps from fixation to staining and mounting.

RATINGS AND COMPUTATION OF STANDING.

Ratings are computed in accordance with the following schedules, copies of which are placed in the hands of the students. We believe in the utmost publicity both as regards evaluation and marking. All test papers are returned to the student plainly marked, and he has the privilege of appeal to the director of the laboratory. We take no little pride in the fact that a student who fails the course rarely questions his low grade. He can keep his own tally and knows where he stands throughout the term. He can also see from these schedules that a final spurt will not counterbalance delinquency through the year.

First-Year Ph.G. Class	
Accepted drawings in histology	125 points
Accepted assignments in morphology	125 points
Written recitations	150 points
Practical examinations	400 points
Theoretical examinations	200 points
Pass rating = 750 points	
	1000 points
First-Year Ph.Ch. Class	
Accepted drawings in histology	90 points
Accepted assignments in morphology	120 points
Accepted drawings and assignments in developmental botany	140 points
Written recitations	150 points
Practical examinations	300 points
Theoretical examinations	200 points
Pass rating = 750 points	
	1000 points
Second-Year Ph.G. Class	
Accepted drawings and assignments in pharmacognosy	160 points
Practical examinations in pharmacognosy	800 points
Theoretical examinations in pharmacognosy	
Pass rating = 1020 points	400 points
	1360 points
Second-Year Ph.Ch. Class	
Accepted assignments in morphology	100 points
Practical examinations in macro-pharmacognosy	400 points
Theoretical examinations in macro-pharmacognosy	
Pass rating = 525 points	200 points
	700 points

Third-Year Ph.Ch. Class	
Accepted drawings in micro-pharmacognosy	250 points
Accepted reports and technic	150 points
Practical examinations in micro-pharmacognosy	400 points
Theoretical examinations in micro-pharmacognosy	
Pass rating = 750 points	200 points
	1000 points

The above data represent strictly botanical or pharmacognostical laboratory work. The subjects of posology, physiology, bacteriology, materia medica and toxicology are taught separately, although these studies, as well as botany and pharmacognosy, are all for purposes of departmental organization, included in the division of Materia Medica.

COLLEGE OF PHARMACY,
COLUMBIA UNIVERSITY.

DR. CHARLES H. MAYO.

ROCHESTER, MINN.

Dr. Charles H. Mayo will be a speaker at the Rapid City meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION. He needs no introduction to pharmacists; his work during the World War is known to everyone and also the Mayo Clinic in Rochester, and his contributions to medical education. The members of the A. PH. A. highly appreciate his coming to the meeting to address them; his subject is "The Chemistry of Nature."

PLANT SCIENCE SEMINAR.

To the Deans of Colleges of Pharmacy, Pharmacognosists, Botanists and Plant Chemists:

This informal greeting is addressed to you with the hope that you will make an effort to have your school represented at the seventh annual meeting of the Plant Science Seminar which will be held in Custer State Park of the Black Hills, Rapid City, South Dakota, August 19th–23rd. This meeting will be followed by the National Conference on Pharmaceutical Research on the 24th and by the annual meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION the following week.

It is not the intention of the Seminar to duplicate in any way the work of the AMERICAN PHARMACEUTICAL ASSOCIATION, but rather to augment its activities.

The meeting this year will be somewhat of an innovation as it is planned to make it a real week's outing in one of Nature's most wonderful playgrounds of the West. Papers and discussions on topics of pharmaceutical botany and pharmacognosy as well as plant chemistry will be continued but the dominant features of this session will be the exchange of herbarium specimens, field trips and the collection of new specimens.

A wealth of natural scenery and an abundance of flora will lend a continuous greeting to those in attendance at the meeting. Experts upon the botany and geology of the locality will accompany the group upon their collection excursions, sight-seeing and fishing trips.

Those interested are urged to come and to send in their contributions to the Secretary.

You and your representatives are most cordially welcomed.

CHARLES E. F. MOLLETT,
Dean School of Pharmacy, University of Montana.

THE DEPARTMENT OF THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY

C. B. JORDAN—CHAIRMAN OF EXECUTIVE COMMITTEE, A. A. C. P., EDITOR OF THIS DEPARTMENT.

The Teachers' Conference of the American Association of Colleges of Pharmacy have proved that they are successful. A great deal of interest has been shown in these meetings. The following articles by Professor Emmert and Dean R. A. Lyman were presented as part of the program of these Conferences.

C. B. JORDAN, *Editor.*

TEACHING DISPENSING IN THE PHARMACY SCHOOL.

BY HERMAN C. EMMERT.*

The art of compounding, this most important and exacting subject, calls for serious application and study. In this brief paper the methods employed, the time spent and the nature of the course as given in this school, will be outlined.

Each student is required to supply the following items: Two sets of weights, one of the apothecaries' and one of the metric system; graduates (wine and metric measure) spatula, mortar and pestle, filter paper, towel, Bunsen burner and notebook. He must have a copy of "Scoville's Art of Compounding" and one of "Ruddiman's Incompatibilities in Prescriptions."

Medicinals such as the elixirs, syrups, tinctures as well as mechanical equipment, such as ointment boxes, powder papers, pill tiles, tablet machines, suppository machines, capsule filling apparatus, tablet molds, capsules, bottles, corks, etc., are supplied from the stock-room.

Each student has a prescription desk assigned to him, stocked with about 85 bottles of drugs and powders, also with a prescription balance.

The course as given here covers eight hours per week, extending over a period of thirty-six weeks.

The incompatible prescriptions are stressed and transposing from one system of weights and measures over to the other is practiced continually.

The student must do his work without assistance except such as is given him by the instructor. Whispering and talking during the laboratory periods is not permitted.

The points that are emphasized in teaching the courses are accuracy, cleanliness, speed and reasoning power. In the notebook must appear all the work in full, and if work handed in is not satisfactory the student repeats it until it is acceptable. Occasionally five repetitions have been required. All repetitions are made on the student's own time and not during regular laboratory periods.

The prescriptions to be filled are written on the blackboard, or original copies are given the student. A time limit is placed on some of the work.

Definitions of many pharmaceutical and Latin terms are gone over and abbreviations studied and reviewed.

An important feature stressed in the course is the training derived from seeing and reading original prescriptions projected on a large screen by a Balopticon.

* Department of Pharmacy, Detroit Institute of Technology.

Each student is called upon to read and discuss the dosage, incompatibility, if any, mode of filling, classification of the ingredients (such as cathartic, anthelmintic, tonic, etc.,) mentioned in the prescription, also the probable ailment prescribed for (this does not concern the pharmacist but it lends interest to the work).

We are very fortunate in having at our disposal for this projection feature thousands of original prescriptions donated or loaned us by many druggists of the city as well as access to stock prescriptions from city hospitals.

The filled prescription is wrapped, and in some instances, priced. I feel that University hospitals, in making use of the filled prescriptions in the treatment of the sick, run too great a risk, unless the individual student is under the immediate and constant supervision of a competent instructor. Another source of danger lies in the fact that the stock material may become contaminated on account of the number of students who handle it.

The average hospitals, too, have a system of dispensing stock prescriptions and this in itself does not constitute worth-while practice for the student.

One more point to bring out is that the sections in prescription practice must be kept small, otherwise the student will not receive the benefit of the instructor's personal supervision.

BUSINESS TRAINING IN SCHOOLS OF PHARMACY.

BY RUFUS A. LYMAN.*

It is a question in the minds of men whether commercial courses belong in a College of Pharmacy. In a state university such courses belong in the College of Commerce. As long as we have Colleges of Commerce it would seem only natural and sensible that the students in Pharmacy should be sent to the College of Commerce for any commercial training we wish them to have, just as we send them to the College of Arts and Science to obtain training in English or other so-called cultural subjects. Personally, I think the College of Pharmacy should stick primarily to the teaching of the pharmaceutical sciences but I also think the schedule should be so arranged as to make it possible for the student to elect fundamental commercial courses, if he so desires.

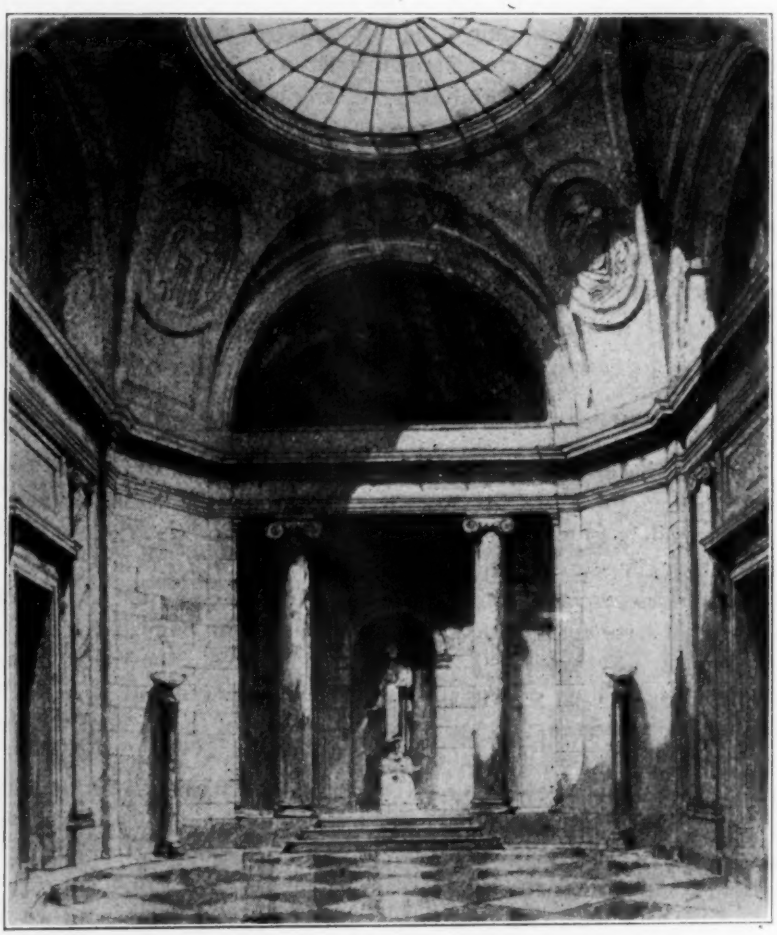
The basic course is accounting. If time permits it should be preceded or accompanied by a course in the fundamental principle of economics. Following these fundamental courses the student should take the elementary courses in business organization, retail store management, salesmanship and business law.

It may be well when we find out just what business training we want our pharmacy students to have, to ask the College of Commerce to adapt some of their courses to the specific needs of pharmacy. Branch IV of the "Commonwealth Study" which deals with commercial pharmacy and merchandise information, is pregnant with suggestions along these lines. I hope when commercial courses are added to the curriculum we will not make the usual mistake which we have made in pharmacy of giving top-heavy courses for which the student is not prepared. Let us stick to fundamentals and teach him the notes before he tackles the "Messiah."

* University of Nebraska, Lincoln.

So far as I have observed I am of the opinion that all of the two- or three-hour courses in so-called commercial pharmacy that are now being given in our colleges consist of a smattering of things which do not give a student any idea of the broad fundamental principles upon which business is founded.

It is an injustice to the student to lead him to think such courses educate him in the principles of business. It is another case of Pharmaceutical cramming. It is not education.



ARCHITECT'S SKETCH OF A MEMORIAL ENTRANCE HALL FOR THE PHARMACY HEADQUARTERS BUILDING AT WASHINGTON, D. C.

THE HEADQUARTERS BUILDING.

The location of the Headquarters Building on the monumental thoroughfare will bring it to the attention of the constantly increasing number of visitors from every section of the country and many from foreign lands. It is highly important that the Building should impress them with the importance of Pharmacy and of the value of the service which it renders in connection with the public health.

ASSOCIATION BUSINESS

AD INTERIM BUSINESS OF THE COUNCIL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, 1928-1929.

Office of the Secretary, 10 West Chase Street, Baltimore, Md.

LETTER NO. 8.

May 11, 1929.

To the Members of the Council:

66. Election of Members. Motions Nos. 22 and 23 (See Council Letter No. 7, pages 425 and 426) have been carried and applicants for membership numbered 116 to 157, inclusive, and applicants for membership numbered H-55 to H-79, inclusive, are declared elected.

67. Life Membership. In accordance with Article IV of Chapter IX of the By-Laws, Robert Audley Sloss of Dannemora, N. Y., has become a Life Member through the payment of $25.00.

68. Text of N. F. V. The following communication has been received from Chairman DuMez of the Committee on Publications:

> "I have gone over the proof sheets of 'Practical Materia Medica,' edited by Dr. Clayton S. Smith and Helen L. Wikoff and published by Lea and Febiger, and as Chairman of the Publications Committee I recommend that permission to use portions of the NATIONAL FORMULARY V text for comment in this book be granted and that a fee of $5.00 be charged for this purpose. Please present this to the Council for a vote."

(*Motion No. 24*) *It is moved by DuMez that Lea & Febiger of Philadelphia be given permission to use portions of the text of the N. F. V in a "Practical Materia Medica" by Clayton S. Smith and Helen L. Wikoff, and at the usual charge of $5.00.*

69. Complimentary Copies of the Pharmaceutical Recipe Book, First Edition. Chairman DuMez of the Committee on Publications recommends, with the approval of Chairman Lascoff, that a copy of this publication with the name stamped on the cover, be sent to the following who are either members of the Committee on Recipe Book or have rendered valuable assistance in connection with the preparation of the first edition:

J. Leon Lascoff	Ivor Griffith
E. N. Gathercoal	H. L. Meredith
P. Henry Utech	W. W. Horne
S. L. Hilton	F. W. Nitardy
H. A. Langenhan	Otto Raubenheimer
W. H. Glover	F. B. Kilmer
W. L. Scoville	C. P. Wimmer
R. R. Gerstner	J. K. Thum
I. A. Becker	C. J. Clayton
M. A. Davis	C. M. Roehr
Robert P. Fischelis	Bernard Fantus
William Gray	L. D. Havenhill
E. Fullerton Cook	Cornelius Osseward
E. G. Eberle	A. G. DuMez
E. F. Kelly	

(*Motion No. 25*) *It is moved by DuMez that a complimentary copy of the Pharmaceutical Recipe Book, First Edition, be sent to each person whose name appears in the list above.*

70. Complimentary Copies of the Pharmaceutical Recipe Book, First Edition. It has been suggested that a complimentary copy of this publication be sent to a number of pharmaceutical publications for review as this will bring the publication to the attention of their readers.

(*Motion No. 26*) *It is moved by DuMez that complimentary copies of the Pharmaceutical Recipe Book be sent to a number of publications for review.*

71. Committee on Cosmetics. In accordance with Resolution No. 7 adopted at the last annual meeting, President Jones has appointed the following as members of this committee:

Geo. D. Beal, *Chairman*, Pittsburgh, Pa.
C. H. LaWall, Philadelphia, Pa.
A. G. DuMez, Baltimore, Md.
F. W. Nitardy, Brooklyn, N. Y.
Bernard Fantus, Chicago, Ill.

72. Committee to Nominate the Members of the Committee on National Formulary. In accordance with the action of the Council authorizing the appointment of this committee of the Council, Chairman Hilton has appointed the following on the committee:

J. A. Koch, *Chairman*, Pittsburgh, Pa.
D. F. Jones, Watertown, S. Dak.
H. V. Arny, New York, N. Y.
H. C. Christensen, Chicago, Ill.
C. H. LaWall, Philadelphia, Pa.

A. G. DuMez, Baltimore, Md.
E. F. Kelly, Baltimore, Md.

73. Applicants for Membership. The following applications properly endorsed and accompanied by the first year's dues have been received:

No. 158, M. E. Berkowitz, U. S. Marine Hospital, 67 Hudson St., New York, N. Y.; No. 159, William L. Buttz, 123 So. Main St., Aberdeen, S. Dak.; No. 160, Wm. M. Decker, Pres., Hygeia Nursing Bottle Co., Inc., Lancaster, N. Y.; No. 161, Manuel Dondé, Popocatepetl 20, Mexico, D. F., Mexico; No. 162, Miguel Fernandez Garrido, Calzada 93, Vedado, Habana, Cuba; No. 163, Ralph E. Harriger, Ridgefield, Wash.; No. 164, William Austin Kelly, 18th and Buttonwood St., Philadelphia, Pa.; No. 165, Carl William Kraft, 5012 22nd Ave., N. E., Seattle, Wash.; No. 166, George Black Laing, 77 Hartley Road, Lansdowne, Pa.; No. 167, Arthur Kenneth Leberknight, Broad and Ontario Sts., Philadelphia, Pa.; No. 168, William Lee Lenderman, 1520 Pike Ave., Ensley, Ala.; No. 169, John Oran Martin, 5215 18th St., N. E., Seattle, Wash.; No. 170, James C. Mayers, 301 E. Girard Ave., Philadelphia, Pa.; No. 171, Joseph Millett, P. O. Box 129, Pen-Mar, Md.; No. 172, Frederick W. Misch, c/o Smith-Dorsey Company, Lincoln, Neb.; No. 173, J. H. Pearson, Webster, S. Dak.; No. 174, C. J. Piaskowski, 7343 McGraw Ave., Detroit, Mich.; No. 175, Mark T. Piaskowski, 7408 Michigan Ave., Detroit, Mich.; No. 176, Leonard J. Piccoli, 88 E. 208th St., New York, N. Y.; No. 177, Eugene Renaud, 13100 Ford Road, Dearborn, Mich.; No. 178, Hugo Rieve, 9525 Bustleton Ave., Philadelphia, Pa.; No. 179, Aaron R. Robinson, 199–201 N. 12th St., Newark, N. J.; No. 180, Frank H. Scarf, 646 Y. M. C. A. Bldg., Detroit, Mich.; No. 181, Harry S. Schneider, 3835 Scotten Ave., Detroit, Mich.; No. 182, George E. Sherman, Huron, S. Dak.; No. 183, G. W. Sigurdson, 214 N. 14th St., Corvallis, Oreg.; No. 184, William L. Slate, Connecticut Agricultural Experiment Station, New Haven, Conn.; No. 185, Ralph Madison Sperry, 507 Parkside Drive, Toronto, Ont.; No. 186, Nikolai Veiderpass, Ruutli 2, Tartu, Estonia; No. 187, R. N. White, c/o Othine Laboratories, Inc., Buffalo, N. Y.; No. 188, Edwin V. Woolley, 312 E. Main St., Streator, Ill.

(*Motion No. 27*) *Vote on applications for active membership in the American Pharmaceutical Association.*

74. Applicants for Membership on Account of Contributions to the Headquarters Building Fund. The following non-members of the A. PH. A. have pledged $25.00 or more to the Headquarters Building Fund and have made a cash payment of $5.00 or more. They are entitled to membership and you are requested to vote on the applications which have been properly endorsed.

H-80, Peter Lazarus Achilson, 2380 8th Ave., New York, N. Y.; H-81, Mary Thelma Bottom, 640 N. 28th St., East St. Louis, Ill.; H-82, J. Raymond Conley, 9 Monroe St., Lockport, N. Y.; H-83, Melvin Durkee, 1302 E. Virginia St., Evansville, Ind.; H-84, Janet Glienke, 892 46th St., Milwaukee, Wis.; H-85, William Garrison Hand, Jr., 229 Third Ave., Dayton, Ky.; H-86, Francis J. Hiskey, 300 S. Gramercy Pl., Los Angeles, Cal.; H-87, Bernard Thomas Kearns, 306 E. Woodland Ave., Fort Wayne, Ind.; H-88, Julius Dominick Lombardi, 244 Westchester Ave., Mount Vernon, N. Y.; H-89, Francisco Margo, c/o City Drug Store, Brownsville, Tex.; H-90, Harry Samuels, 112–24 Blvd., Rockaway Park, L. I., N. Y.; H-91, Frank M. Spero, 90–92 Roosevelt St., New York, N. Y.; H-92, Leslie Tester, Waconia, Minn.

(*Motion No. 28*) *Vote on applications of contributors to the Headquarters Building Fund for membership in the American Pharmaceutical Association.*

E. F. KELLY, *Secretary.*

COMMITTEE ON PHARMACOGNOSY AND PHARMACEUTICAL BOTANY OF NATIONAL RESEARCH COUNCIL.

All of the members of the Committee on Pharmacognosy and Pharmaceutical Botany of the National Research Council have been reappointed for the coming year. They include H. H. Rusby, W. W. Stockberger, E. N. Gathercoal, E. L. Newcomb and Heber W. Youngken who succeeds himself as chairman. Contributions for the research Fund of the Committee have been received from the H. K. Mulford Co., the Illinois State Pharmaceutical Association, the Lambert Chemical Co., the American Association of Colleges of Pharmacy and the Carlton and Hovey Co.

PROCEEDINGS OF THE LOCAL BRANCHES

"All papers presented to the Association and Branches shall become the property of the Association with the understanding that they are not to be published in any other publication prior to their publication in those of the Association, except with the consent of the Council." —Part of Chapter VI, Article VI of the By-Laws.

ARTICLE III of Chapter VII reads: "The objects and aims of local branches of this Association shall be the same as set forth in ARTICLE I of the Constitution of this body, *and the acts of local branches shall in no way commit or bind this Association, and can only serve as recommendations to it.* And no local branch shall enact any article of Constitution or By-Law to conflict with the Constitution or By-Laws of this Association."

ARTICLE IV of Chapter VII reads: "Each local branch having not less than 50 dues-paid members of the Association, holding not less than six meetings annually with an attendance of not less than 9 members at each meeting, and the proceedings of which shall have been submitted to the JOURNAL for publication, may elect one representative to the House of Delegates."

Reports of the meetings of the Local Branches shall be mailed to the Editor on the day following the meeting, if possible. Minutes should be typewritten, with wide spaces between the lines. Care should be taken to give proper names correctly and manuscript should be signed by the reporter.

BALTIMORE.

The last meeting of the Baltimore Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION for the Spring of 1929 was held at the Emerson Hotel on Friday, May 24th, President Frank L. Black presiding.

Wm. R. Pohler, Prohibition Agent in Charge of the Baltimore Office, spoke concerning the laws and regulations pertaining to the dispensing of alcoholic liquors for medicinal purposes. He related some of the unusual conditions, as well as amusing incidents in his experience as a Prohibition Agent. He also pointed out some of the negligent shortcomings in connection with records, reports, renewal of permits, etc., of pharmacists as permittees under the National Prohibition Law, but assured the members of the Branch that the pharmacists of Baltimore and of the State of Maryland were, with very few exceptions, coöperative with his department. He, however, urged that pharmacists thoroughly familiarize themselves with the regulations and decisions concerning the law as issued. He particularly complimented the School of Pharmacy of the University of Maryland in having representatives from the Prohibition Department speak each year before the members of the third-year class concerning the National Prohibition Law and its regulations, and stated that the younger members of the profession were thus being made acquainted with the necessary procedure they must follow as permittees. He also stated that the Jones Bill was not intended to inflict heavy penalties on pharmacists as permittees when they unwittingly or unintentionally disobeyed the law, but was intended for the punishment of those persons who flagrantly and persistently violate the National Prohibition Law.

Secretary E. F. Kelly stated that he had been requested to procure copy No. 1 Series A, of the Recipe Book recently published by the AMERICAN PHARMACEUTICAL ASSOCIATION for the purpose of having it presented as a fitting memorial to the late Dr. Henry P. Hynson, the originator of the Recipe Book. Upon motion, duly seconded, it was voted that the Baltimore Branch present this copy of the Recipe Book, together with such other historical matter as may be decided upon, arranged in a suitable case, to the AMERICAN PHARMACEUTICAL ASSOCIATION, to be placed in the Library of the Headquarters Building when erected, as a memorial to the late honored and beloved Dr. Henry P. Hynson of Baltimore. This presentation will likely take place at the annual meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION in Rapid City, S. D.

B. OLIVE COLE, *Secretary-Treasurer.*

DETROIT.

The joint meeting of the Detroit Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION and the College of Pharmacy was held in Ann Arbor on the evening of May 16th. Dinner was served in the new Women's League Building after an inspection trip had been made through that building by the members present. About ninety were seated at the dinner. The speaker

of the evening was Dr. Cyrus C. Sturgis, Director of the Simpson Memorial Institute for Medical Research and Professor of Medicine and Director of the Department of Internal Medicine in the Medical School. His address which was illustrated, dealt with the work of the Simpson Memorial Institute and the relationship of the Institute to the problem of pernicious anemia.

NEW YORK.

A special meeting of New York Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held June 5th, for the purpose of formally awarding the Remington Honor Medal to Wilbur L. Scoville. The Committee who had the interesting affair in charge were: *Chairman*, Robert S. Lehman, Joseph L. Mayer, Henry V. Arny, Robert R. Gerstner, Hugo H. Schaefer and Otto F. A. Canis.

A dinner at Hotel Empire preceded the meeting; after the repast, the members repaired to the New York College of Pharmacy. The Introductory Remarks were made by President Hugo H. Schaefer, in which a history of the Medal was given, evidencing care in preserving the records.

Dr. H. V. Arny's subject was "The National Formulary and Wilbur Scoville." The speaker gave an outline of the revision and depicted the characteristics and painstaking efforts of the Chairman.

Secretary E. F. Kelly, of the AMERICAN PHARMACEUTICAL ASSOCIATION had been assigned the subject "The AMERICAN PHARMACEUTICAL ASSOCIATION and Wilbur Scoville," but important business for the ASSOCIATION detained the Secretary in Washington, therefore, Chairman of the Council Samuel L. Hilton spoke for him and he ably handled the subject, stressing the deep interest and valuable contributions to pharmacy made by the Medalist and his work in and for the ASSOCIATION.

Former president of the A. PH. A., Frederick J. Wulling, spoke on "Pharmaceutical Research and Wilbur Scoville." He defined research, its importance, and applied the attributes to the honored guest and closed with well-deserved tributes directed to the research worker.

The Senior Ex-President of the New York Branch, A. PH. A., Dr. Jacob Diner officially presented the medal with words chosen to fit the recipient. His remarks were brief but comprehensive, supplementing and complementing the former speakers, and left no doubt relative to the worthiness of the award.

Dr. Scoville gave due credit to his co-workers. In substance the speaker said that besides projecting its research into new fields, medical science is doubling back on its old tracks because new studies of old drugs are revealing hitherto unrealized uses and values, and bringing, to light greater knowledge of them. He said there are many unknown or not well understood factors in life processes and these may be very important in determining the values of drugs. The discovery of vitamins and of the health influence of foods as compared to their nutritive value suggests similar conditions in drugs and opens a new field of research. Quoting the speaker:

"Work already in progress indicates that new processes of growing, preserving, handling and extracting of drugs are a possibility. One result of the study so far conducted is the insight into how nature uses the functions of the vegetable kingdom to supply the needs of the animal world.

"There is a renaissance of drugs already begun. Recent studies on enzymes, vitamins and endocrine glands have shown that while the chemical composition of vegetable or animal substances may be obscure and their mode of action not clear, yet their influence may be of great importance. We now realize that even minute traces of chemical bodies of unknown composition may exert a profound influence upon life processes. This had led to a new study of drugs, both new and old. Some of the older drugs, which would not down, but which were persistently ignored in the past, are receiving new attention. Such old-fashioned remedies as horehound, boneset, galega and valerian are being studied and new properties have been found in some."

After adjournment the members were shown through the building. A most valuable recent contribution is that made by Dr. J. Leon Lascoff of the apothecary shop of 1829 and the pharmacy of 1929. The former represents an historical value and the latter an investment in a very complete prescription stock, utensils, apparatus and furniture. In addition to the foregoing it gives the young pharmacist an idea of what pharmacy has been and points the way to newer and better methods.

PHILADELPHIA.

The May meeting of the Philadelphia Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held Tuesday evening the 14th at the P. A. R. D. Building, 2017 Spring Garden

Street; President Hoch presided. The minutes of the April meeting were read by the Secretary and approved.

The organization of student branches of the AMERICAN PHARMACEUTICAL ASSOCIATION was discussed and it was the opinion of the representatives of the Philadelphia colleges of pharmacy that the students have so many extra activities that a new organization would not be successful at the present time. The matter was tabled.

Applications for membership in the parent organization were received from Wilbur Lee Barr, 1035 Robeson Street, Reading, and Sister Mary Irenus Mathews, St. Mary's Hospital, Philadelphia.

President Hoch called on the members for opinions regarding topics for meetings to be held during the remaining portion of the year. Due to the feeling among the members a joint Physicians-Pharmacists' meeting was thought essential sometime during the fall. A motion was adopted to hold a joint dinner and meeting for the physicians, members of the Philadelphia Association of Retail Druggists and members of the Philadelphia Branch A. PH. A. Prof. E. F. Cook suggested that one meeting should be devoted to a discussion of the revision of the U. S. P. because of the coming Pharmacopœial Convention which will be held in Washington D. C., in 1930.

Prof. Louis Gershenfeld of the Philadelphia College of Pharmacy and Science was presented by President Hoch. He conducted a forum on the subject: "Bacteriology and the Sanitary Sciences—Their Relation to Pharmacy." He gave a brief outline of this very broad subject and emphasized the importance of retail pharmacists being well informed in this field in order that they may serve the public in a more intelligent manner. In the open discussions which followed his introductory remarks much valuable information was imparted relative to the proper use of antiseptics, germicides and fumigating agents as well as the proper agents for obtaining the most satisfactory results. It was brought out that the lack of success in using germicidal agents, disinfectants and fumigating agents in the home, apartment houses and factories is often due to the use of improper agents, or an insufficient quantity to be effective. Pharmacists are frequently criticised by the public on the results obtained by using the various sanitary agents and in most cases they have been misinformed or not informed at all by them. In apartment house and factory districts of our large cities the field for selling various sanitary agents is large and one that should be developed by pharmacists, as it covers something rightfully within the scope of Pharmacy. To obtain the best results at all times pharmacists must be informed relative to the proper agent and should instruct the customer in the proper methods of application, especially in the extermination of the more common pests found in the home.

At the close of the meeting Professor Gershenfeld was given a rising vote of thanks by the members.

FRANK H. EBY, *Secretary.*

PITTSBURGH.

The Pittsburgh Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION held its regular monthly meeting May 8, 1929, at Webster Hall.

This occasion marked the third annual dinner and joint session of the Pittsburgh Branch and the Veteran Druggists' Association of Pittsburgh. Dinner was served to sixty-five members and guests.

The meeting was called to order by President John G. Rees, who presented Prof. C. Leonard O'Connell, under whose supervision the program for the evening had been prepared.

Professor O'Connell, acting as Chairman, made known to the members the fact that a Student's Branch had been formed at the Pittsburgh College of Pharmacy. He also stated that this would probably be one of the largest student branches in the Association.

The evening's entertainment was most delightful and enjoyable. Members of the student branch prepared and presented original essays. Since awards were to be made the Chairman announced the selection of judges as follows: Louis Emanuel of Pittsburgh, James H. Beal of Florida and J. R. Thompson of Pittsburgh.

Six essays were presented and because of the fact that the subjects were varied the program was quite diversified, and covered many phases of the field of Pharmacy.

The judges, after due deliberation, decided that awards be made as follows:

First award, $10.00 in gold to Charles Freud, member of the Freshman Class of the Pittsburgh College of Pharmacy.

Second award, $5.00 in gold to Melvin Green, member of the Freshman Class of the Pittsburgh College of Pharmacy.

Honorable award, $5.00 each, to Messrs. Howard Dolyak, Arthur Lossasso, John Bar-

rett and Clifford Reinsel, all members of the Student Branch.

Chairman O'Connell, on behalf of the Veteran Druggists' Association of Pittsburgh made the presentations.

The program was concluded after several members commented on the excellent papers and the diligent work that had been expended in making the evening a pleasurable one.

UNIVERSITY OF WASHINGTON.

The regular monthly meeting of the University of Washington Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held April 13th in the Bagley Hall auditorium; Dean Rufus A. Lyman was the speaker. In order to allow for a large student attendance the meeting was called to order at 3:30 P.M. by President Guth. Dean Johnson introduced the speaker who talked on the "Value of Physiology in Pharmacy." Dean Lyman spoke of the advance in the science of physiology and the science of new remedies, explaining the correlation between the two, as one of the several reasons why a pharmacist must have a knowledge of physiology. Dean Lyman's talk illustrated the need of the scientific subjects taught in the colleges of pharmacy as a basis for the general work of the pharmacist.

One hundred and seventy-five were present. Few retail druggists availed themselves of the opportunity to hear Dean Lyman; this was possibly due to the hour at which the meeting was called.

MAY.

The regular monthly meeting was held May 28th, at the University Commons. One hundred and two assembled at 6:00 P.M. for dinner. After dinner President Earl Guth called on Dean Johnson who announced the following awards to students graduating this year: Edgar A. Kelly, Denny Fellowship in Pharmacy; Ewen Gillis, Skagit Valley Golden Seal Farm Fellowship; Ivor Jones, U. of W. Branch AMERICAN PHARMACEUTICAL ASSOCIATION Medal; Elsa L. Hillebrecht, Lehn & Fink Medal; Clarence W. Loan, Linton Memorial Award.

Earl Guth, J. W. Codling and J. M. Gooch were recipients of life membership in the National Association of Drug Clerks.

Mention was also made of the appointments of F. V. Lofgren as Professor of Pharmacy, and acting Dean, College of Pharmacy, Valparaiso University; Earl W. Rising as Associate Professor of Pharmacy, University of South Carolina, and Clivenden Cox as Associate of Pharmacy, Medical College of Virginia, College of Pharmacy. Those named are at present members of the College Staff.

After Dean Johnson's announcement the President introduced Mr. George Hubbard, Collector of Customs, Seattle, who talked on "Narcotic Importation." Mr. Hubbard related many interesting incidents relative to the smuggling of opium and presented many curious and odd containers used for that purpose. As would be expected this brought up many questions from the listeners and the speaker had little time for other phases of the subject. At the conclusion of Mr. Hubbard's talk, President Guth addressed those instructors and graduates who were leaving, also including Dean Johnson who has been granted a year's leave of absence, extending to all the best wishes for success, from the Branch.

H. A. LANGENHAN, *Secretary.*

DETERMINATION OF THE ABSORPTION POWER OF ERGOT ALKALOIDS IN THE ULTRAVIOLET AND ITS PRACTICAL APPLICATION.

Ergotinine, ergotoxine, ergotamine and ergotaminine, the four known alkaloids of ergot, show almost identical absorption in the ultraviolet, with a maximum at 316$\mu\mu$ and minimum at 272$\mu\mu$. The alkaloidal content of ergot may be determined by comparing the absorption of the alkaloid fraction of the extract with that of a solution of ergotamine of known concentration. The Keller-Fromme method was used for the extraction of the alkaloids, except that 1 per cent tartaric acid was substituted for 0.25 per cent hydrochloric acid. The alkaloidal solution thus obtained, after filtration and dilution when necessary was photographed through the spectroscope in layers of 2–40 mm., and the concentration determined by comparison with a similar spectrograph of a solution containing 4 mg. of ergotamine in 50 cc. of 1 per cent tartaric acid. The result obtained in this way compared fairly well with parallel determinations made by the chemical method of Keller and the physiological method of Broom and Clarke.—A. Harmsma (*Pharm. Weekbl.*, 65 (1928), 1114; *Chem. Abstr.* (January 10, 1929), 235; through *Ph. J. & Ph.* (March 16, 1929).

EDITORIAL NOTES

Editor: E. G. EBERLE, 10 West Chase St., Baltimore, Md.

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NEW AND NONOFFICIAL REMEDIES.

The following additional articles have been accepted as conforming to the rules of the Council on Pharmacy and Chemistry of the American Medical Association for admission to New and Nonofficial Remedies. A copy of the Rules on which the Council bases its action will be sent on application.

W. A. PUCKNER, *Secretary.*

NORMAL HORSE SERUM (See New and Nonofficial Remedies, 1928, p. 348).

The National Drug Co., Philadelphia.

Normal Horse Serum.—Marketed in packages of one syringe containing 10 cc.; in packages of two syringes each containing 10 cc.; in packages of one vial containing 25 cc.; in packages of one double-ended vial containing 50 cc.; also in packages of one double-ended vial containing 100 cc.

DIPHTHERIA ANTITOXIN, CONCENTRATED (See New and Nonofficial Remedies, 1928, p. 352).

The National Drug Co., Philadelphia.

Diphtheria Antitoxin, Extra Concentrated.—Prepared by inoculating horses with diphtheria toxin. The product is concentrated by the Banzhaf method and preserved with 0.4 per cent cresol. Marketed in single vial packages of 1000 and 20,000 units: in syringes containing, respectively, 1000, 3000, 5000, 10,000 and 20,000 units.

TETANUS ANTITOXIN, CONCENTRATED (See New and Nonofficial Remedies, 1928, p. 356).

The National Drug Co., Philadelphia.

Tetanus Antitoxin.—Prepared by inoculating horses with tetanus toxin. The product is concentrated by the Banzhaf method and preserved with 0.4 per cent cresol. Marketed in packages of one vial containing 1500 units; in packages of one syringe containing 1500 units; also in packages of one syringe containing 5000 units.

ANTISTREPTOCOCCUS SERUM (See New and Nonofficial Remedies, 1928, p 361).

The National Drug Co., Philadelphia.

Antistreptococcic Serum.—A polyvalent serum obtained by immunizing horses with streptococci from various clinical sources. Marketed in packages of one syringe containing 20 cc. and in packages of one double-ended vial containing 50 cc. accompanied by apparatus for intravenous injection.

VACCINE VIRUS (See New and Nonofficial Remedies, 1928, p. 362).

The National Drug Co., Philadelphia.

Vaccine Virus.—Marketed in packages containing, respectively, one, five and ten capillary tubes.

ANTIRABIC VACCINE (See New and Nonofficial Remedies, 1928, p. 363).

The National Drug Co., Philadelphia.

Rabies Vaccine-Human (Semple Method).—An antirabic vaccine prepared according to the general method of David Semple (phenol killed). The brains and spinal cords of rabbits killed on the sixth or seventh day after inoculation with fixed virus rabies are ground with physiological solution of sodium chloride containing 1 per cent of phenol to yield an 8 per cent suspension of brain substance.

The mixture is incubated at 37 C. for twenty-four hours and then diluted with an equal volume of physiological solution of sodium chloride so that the finished product represents a 4 per cent emulsion marketed in sets of two packages, the first containing four 2-cc. vials and the second containing ten 2-cc. vials. All the doses are of the same potency; one dose is to be given daily over a period of fourteen days.

PERTUSSIS BACILLUS VACCINE (See New and Nonofficial Remedies, 1928, p. 376).

The National Drug Co., Philadelphia.

Pertussis Vaccine.—A suspension of killed *Bacillus pertussis* in physiological solution of sodium chloride, preserved with 0.4 per cent cresol. Marketed in packages of one 5-cc. vial containing 4000 million killed pertussis bacilli per cubic centimeter; in packages of one 15-cc. vial containing 4000 million killed pertussis bacilli per cubic centimeter; in packages of one 30-cc. vial containing 4000 million killed pertussis bacilli per cubic centimeter.

PNEUMOCOCCUS VACCINE (See New and Nonofficial Remedies, 1928, p. 379).

The National Drug Co., Phialdelphia.

Pneumococcus Vaccine.—A suspension of killed pneumococci Types I, II, III, IV in physiological solution of sodium chloride, preserved with 0.4 per cent cresol. Marketed in packages of one 5-cc. vial con-

taining 5000 million killed pneumococci per cubic centimeter; in packages of one 15-cc. vial containing 5000 million killed pneumococci per cubic centimeter; in packages of one 30-cc. vial containing 5000 million killed pneumococci per cubic centimeter.

STAPHYLOCOCCUS VACCINE (See New and Nonofficial Remedies, 1928, p. 381).

The National Drug Co., Philadelphia.

Staphylococcus Vaccine.—A suspension of killed *Staphylococcus albus* and killed *Staphylococcus aureus* in equal proportions, in physiological solution of sodium chloride, preserved with 0.4 per cent cresol. Marketed in packages of one 5-cc. vial containing 2000 million killed bacilli per cubic centimeter; in packages of one 15-cc. vial containing 2000 million killed bacilli per cubic centimeter; in packages of one 30-cc. vial containing 2000 million killed bacilli per cubic centimeter.

TYPHOID VACCINE (See New and Nonofficial Remedies, 1928, p. 383).

The National Drug Co., Philadelphia.

Typhoid Vaccine.—A suspension of killed *Bacillus typhosus* in physiological solution of sodium chloride, preserved with 0.4 per cent cresol. Marketed in packages of one 5-cc. vial containing 1500 million killed typhoid bacilli per cubic centimeter; in packages of one 15-cc. vial containing 1500 million killed typhoid bacilli per cubic centimeter; in packages of one 30-cc. vial containing 1500 million killed typhoid bacilli per cubic centimeter.

Typhoid-Paratyphoid Combined Vaccine.—A suspension of killed *Bacillus typhosus*, killed *Bacillus paratyphosus* A and killed *Bacillus paratyphosus* B in physiological solution of sodium chloride, preserved with 0.4 per cent cresol. Marketed in packages of three 1-cc. vials, the first dose containing 500 million killed typhoid bacilli, 375 million killed parathyphoid A bacilli and 375 million killed parathyphoid B bacilli, the second and third doses each containing 1000 million killed typhoid bacilli, 750 million killed paratyphoid A bacilli and 750 million killed paratyphoid B bacilli; in packages of one 5-cc. vial containing 1000 million killed typhoid bacilli, 750 million killed paratyphoid A bacilli and 750 million killed paratyphoid B bacilli per cubic centimeter; in packages of one 15-cc. vial containing 1000 million killed typhoid bacilli, 750 million killed paratyphoid A bacilli and 750 million killed paratyphoid B bacilli per cubic centimeter; in packages of one 30-cc. vial containing 1000 million killed typhoid bacilli, 750 million killed parathyphoid A bacilli and 750 million killed paratyphoid B bacilli per cubic centimeter; in packages of ninety 1-cc. vials (thirty immunizations), being thirty sets of three doses, the first dose containing 500 million killed typhoid bacilli and 375 million each of killed parathyphoid A and B bacilli, the second and third doses containing, respectively, twice the number of bacilli in the first dose.

Typhoid-Paratyphoid A Vaccine.—Marketed in packages of one 5-cc. vial containing 750 million killed typhoid bacilli and 250 million killed parathyhoid A bacilli per cubic centimeter; in packages of one 15-cc. vial containing 750 million killed typhoid bacilli and 250 million killed paratyphoid A bacilli per cubic centimeter; in packages of one 30-cc. vial containing 750 million killed typhoid bacilli and 250 million killed paratyphoid A bacilli per cubic centimeter.

SCARLET FEVER IMMUNITY TEST (See New and Nonofficial Remedies, 1928, p. 392).

Parke, Davis & Company, Detroit.

Scarlet Fever Streptococcus Toxin for Preventive Immunization-P. D. & Co.—Prepared by the method of Drs. Dick under U. S. patent 1,547,369 (July 28, 1925; expires 1942) by license of the Scarlet Fever Committee, Inc. Marketed in packages of five vials of toxin (Bio. 157) containing, respectively, 500, 2000, 8000, 25,000 and 80,000 skin-test doses; in packages of fifty vials of toxin (Bio. 158), ten containing 500 skin-test doses, ten containing 2000 skin-test doses, ten containing 8000 skin-test doses, ten containing 25,000 skin-test doses and ten containing 80,000 skin-test doses.

From *Jour. A. M. A.* for January 5, 1929.

VITAMIN POTENCY OF COD LIVER OIL.

Cod liver oil, vitamin potency. Antirachitic potency in relation to volume of oil in the liver of the cod. A. F. Hess, C. E. Bills and E. M. Honeywell—*J. A. M. A.*, 92 (1929), 226.—Through *Squibb Abstract Bulletin*, January 30th.

"It has long been known that there is a marked variability in the antirachitic potency of cod liver oil; that for unexplained reasons oils of higher or lower potency are obtained at the same season of the year and even from fish in the same locality. The same is true in regard to vitamin A, as was brought out some years ago in a study by Zilca and Drummond. As far as we are aware, the only livers of the cod which have been assayed for their antirachitic value have been those obtained in either the spring or the summer months—in other words at the time of the year when the livers are large and fat and yield the greatest amount of oil. When they are 'poor,' that is to say, small and lean, it has been taken for granted that they are unsuitable for the extraction of oil of a high grade."

The authors extracted the oil from just such "poor" cod livers by repeated cold ether treatment and assayed the oils according to a technic which consisted in placing young rats on the low-phosphorus McCollum ration and noting the percentage of oil which it is necessary to add in order to bring about calcification within 5 days. Using a par of 100 to designate a high-grade medicinal cod liver oil and being assured of quantitative accuracy by working with large numbers of animals, the authors found that all fish liver oils were of a high potency, none as low as the standard of 100. The lowest, 150, was from a liver that weighed 150 Gm., contained 30 Gm. of oil and therefore showed a liver oil ratio of 5. The most potent oil, assaying at 20,000, was extracted from a liver that weighs 45 Gm., contained only 0.27 Gm. of oil and had a liver-oil ratio of 167. It is apparent that antirachitic potency varies inversely with the amount of oil in the liver and that cod liver oil may be 200 times as potent as the oil which is now considered to be "high grade." Such highly potent oil was found to be very dark and could be contained only in minute amount by extracting the liver with solvents. It is concluded that the oil from certain cod livers is fully 1000 times as potent as that from others of the same species. —J. P.

VITAMIN B TERMINOLOGY.

A committee appointed by the American Society of Biological Chemists to consider the various proposed systems of vitamin B terminology reports as follows: (*a*) That the term "Bios" be used to designate the factor or factors encouraging the rapid growth of yeast cells; (*b*) That the term "B" be restricted to the more heat-labile (antineuritic) factor; (*c*) That the term "G" be used for the more heat-stable water-soluble dietary factor, called the P.P. (pellagra-preventive) factor by Goldberger and his associates, and which also has to do with maintenance acid growth; (*d*) That the naming of newly discovered dietary factors, by other than descriptive terms, should be discouraged until their identity was established beyond doubt. It is also recommended that American, British and Continental committees should coöperate as a clearing-house for questions of vitamin terminology.—A. Seidell, H. C. Sherman, P. A. Levene, H. Steenbock, E. V. McCollum and R. A. Dutcher (*Science* (March 8th), 276).

The spelling "Vitamin" has been quite generally adopted. The JOURNAL has followed the U. S. Pharmacopœia with an "e" ending. In order to coöperate in behalf of uniformity the ending "e" will be dropped.

ANESTHETICS, EXPLOSIBILITY.

Recently at Evansville, Ind., a tank containing nitrous oxide exploded, killing an anesthetist, maiming his attendant, and wrecking several rooms by the violence of the explosion. Since nitrous oxide itself will not explode, and there was no tank of ethylene in the room it was assumed that the nitrous oxide cylinder contained some ethylene producing an unknown mixture of highly explosive nature. Inexpensive devices are manufactued which when attached to old type apparatus prevent the mixture of the two gases in ethylene-oxygen anesthesia. The machine in the hospital where the explosion occurred was not equipped. No one capable of studying the problem of ether explosion, nitrous oxide-oxygen-ether explosions and ethylene-oxygen explosions, has issued an adequate report on the basis of which the apparatus and procedure in the operating room might be so standardized in principle that all these explosions would be prevented. When ether-oxygen anesthesia is administered through any of the anesthetic machines, or when nitrous oxide-oxygen-ether anesthesia is similarly administered, the dangers of fatal and disastrous explosions are imminent. At present only the ethylene accidents and deaths are regularly reported.—M. R.—*Squibb Abstract Bulletin*, from *Jour. A. M. A.*

The recent deplorable explosion in the Cleveland Clinic cost more than one hundred lives, most of them due to poisonous gas compounds; the deaths of some of the victims occurred after, it was supposed, the danger was over.

A QUICK AND EXACT METHOD TO ESTIMATE NICOTINE IN TOBACCO.

Air-dried tobacco is reduced to powder. For the nicotine extraction a graduated shaking cylinder of 250 cc. capacity is used, which between the marks at 60 and 70 cc. is fitted with a tubulure and stop-cock. Ten grams tobacco, 10 cc. 20 per cent KOH, 100 cc. ether and 100 cc. petroleum ether are vigorously shaken for fifteen minutes; the shaking is repeated several times and the mixture put aside for a few hours to settle. One hundred cc. of the perfectly clear mixture (= 5 Gm. of tobacco) are filtered from the tubulure through a filter with exsiccated Na_2SO_4 into an Erlenmeyer flask, the filter is well washed with dry ether, the ether-petroleum ether mixture is then distilled off and the residue, which is more or less green colored, is extracted with cold H_2O. After some standing it is filtered, the filtrate being in most cases colorless, sometimes slightly opaque. Titration is carried out with $N/10$ HCl, using congo red as indicator. The results agree well with values obtained by other methods. L. Frank (*Chem.-Ztg.* (1927), 658; through *Pharm. J. and Pharmacist*).

SOURCES OF ERROR IN BJOERKLUND'S ETHER TEST IN THE EXAMINATION OF OIL OF THEOBROMA.

Bjoerklund's test for detecting the presence of tallow, wax and carnauba wax requires that a solution of 5 Gm. cacao butter in 10 Gm. ether remains clear at a temperature of 0° C. for ten minutes. With several samples of pure cacao butter a turbidity or the separation of semiglobular formations on the sides of the test-tube was observed after four or five minutes' standing at 0° C. This was caused by the mechanical admixture of dirt particles which acted as centers of crystallization. The fact that these solutions behaved normally after they had been filtered through a pledget of cotton-wool is proof of the contention. It is therefore recommended to filter the ether

solution of such oils before the test is repeated. H. Will (*Ap. Ztg.*, (1927), 982).

UNITED STATES CIVIL SERVICE EXAMINATION.

The United States Civil Service Commission announces an examination for bacteriologist. Applications must be on file with the Civil Service Commission at Washington, D. C., not later than July 3rd. The examination is to fill a vacancy in the United States Public Health Service, Honolulu, Hawaii. The entrance salary is $4000 a year. Higher-salaried positions are filled through promotion. The duties are to carry on bacteriological investigations and research on matters pertaining to the public health. Competitors will not be required to report for examination at any place, but will be rated on their education, training, experience and fitness, and on publications, or a thesis filed by the applicant.

Full information may be obtained from the United States Civil Service Commission, Washington, D. C., or the secretary of the United States Civil Service Board of Examiners at the post office or customhouse in any city.

CHICAGO WORLD'S FAIR.

The principal building at the Chicago World's Fair in 1933 will be a huge Hall of Science, from which will radiate the main exposition buildings housing the many big industrial exhibits. These individual exhibits will not be of the usual "trade" variety, wherein competitive products of manufacture are shown. They will be coöperative and express the accomplishments of the industry as a unit. In each, it is proposed that the achievements of sciénce, practically applied, shall be a feature. And these exhibits will be coördinated with the purely scientific display shown in the Hall of Science.

PERSONAL AND NEWS ITEMS.

B. V. Christensen has compiled a list of drug plants of Florida, with brief descriptions and other notes. The contribution is published as *Bulletin No. 14*, of the Department of Agriculture, of the State of Florida.

W. A. Prout, of the Medical College of the State of South Carolina, has been granted a 2-year leave of absence which will be spent at the University of Virginia in completing the requirements for the degree of Doctor of Philosophy. Mr. Prout earned a fellowship at the U. of Va.

John C. Krantz, Jr., addressed the Tristate Conference of State Board Members and Pharmaceutical Educators at Atlantic City on "Some Recent Research Achievements in Pharmacy." The address is published in the *American Journal of Pharmacy* for April.

Governor Bulow, of South Dakota, attended the international meeting of Rotarians, in Dallas, last month. In a contribution to the press the Governor said: "The scenic beauty of our wonderful Black Hills cannot be described. It must be seen. While we point with pardonable pride to these natural resources of our great young state, we have a higher pride in its splendid citizenship." The AMERICAN PHARMACEUTICAL ASSOCIATION will hold its 77th annual meeting in Rapid City during the week of August 26th.

President Nicholas Murray Butler, of Columbia University, in conferring the honorary degrees of Doctor of Science in Pharmacy, on the occasion of the centenary of the College of Pharmacy, used the following formulas:

Walter Arthur Bastedo—"Native of Canada, graduated at the University of Toronto and then trained for your profession at the College of Pharmacy and at our own College of Physicians and Surgeons; eager and untiring in relating teaching and research in pharmacy to the study and practice of medicine; author and practitioner in the fields of pharmaceutical science and clinical medicine."

Robert Anthony Hatcher—"Native of Missouri, graduated at the Philadelphia College of Pharmacy and in medicine at Tulane University, professor of pharmacology and materia medica in the Medical School of Cornell University; constantly and effectively interpreting pharmacy and medicine to each other."

Charles Frederick Schleussner—"Born in Germany and graduated from the New York College of Pharmacy fifty-six years ago; chief pharmacist at the Lenox Hill Hospital, illustrating in a long and active life the value of the professional knowledge that you so amply possess."

Wilbur Lincoln Scoville—"Native of Connecticut, graduated at the Massachusetts College of Pharmacy and later for many years professor of pharmacy at that institution, holding many important positions and awarded many professional distinctions, now in professional service at Detroit, Mich."

Frederick John Wulling—"Native of Brooklyn, graduated at the New York College of Pharmacy and later winning many professional

and academic distinctions, dean of the faculty and professor of pharmacology at the College of Pharmacy of the University of Minnesota since 1892."

E. M. Houghton—director of the medical and research laboratories of Parke, Davis & Co., and a member of the Company's scientific staff since 1895—has retired, but will remain on the scientific staff as consulting director of the research and biological laboratories.

Dr. Houghton was graduated from the University of Michigan with the degree of pharmaceutical chemist in 1893 and received the degree of doctor of medicine two years later. He was assistant in pharmacology at the University of Michigan in 1894–5; lecturer in pharmacology at the Detroit College of Medicine from 1897 to 1903, and has been a special lecturer at the University. In 1908 he was appointed by the State Department as delegate of the United States to the International Congress of Applied Chemistry in London. For several years he has been chairman of the biological section of the American Drug Manufacturers' Association. He is a member of the American Medical Association, the AMERICAN PHARMACEUTICAL ASSOCIATION and numerous other professional societies related to his field of work.

Louis H. Roddis, Lt. Comdr., M. C., U. S. N., F. A. C. P., who is interested in historical subjects, including that of pharmaceutical history has sketched for "The Annals of Medical History"—Garcia da Orta, a pioneer in pharmacognosy.

Dean and Mrs. Charles H. LaWall have sailed for Europe and will spend several months in Great Britain.

Professor and Mrs. R. A. Kuever will spend several months in Europe. During the greater part of the time Dr. Kuever will be engaged in the Bayer Laboratories, Germany.

Technical Sergeant Osco Shearer, of the Medical Department of the U. S. Army, has been relieved from duty at Walter Reed Hospital, Washington, D. C., and assigned to William Beaumont General Hospital, El Paso, Texas, for duty. The ability of Sergeant Shearer has been highly spoken of by a number of Congressmen and evidenced by his record as pharmacist.

This is the centenary year of the death of Sir Humphry Davy, during his earlier years an apprentice in the pharmacy of Apothecary Borlase, of Penzance. To Davy we owe the isolation of sodium and potassium and the determination of the elementary nature of chlorine and iodine.

Joseph Jacobs, Atlanta, Ga., recently contributed an interesting article on "Soda Water in the 70's" to *The Silver Cow*, a publication in the interest of the Southern dairies and the ice cream industries. Dr. Jacobs' health has not been good, necessitating consultation with specialists, and Mr. Jacobs' attendance at Rapid City is dependent on the success of the doctors.

Lewis Wait Rising has accepted professorship in pharmacy at the University of South Carolina. He will receive his Ph.D. degree in pharmacy this June at Washington State University. His research work has been on "Hypnotics of the Barbituric Acid Series." Mr. Rising came to Seattle from Oregon State College and has been a teaching fellow at the College of Pharmacy.

Emerson G. Wulling, son of Dean and Mrs. Wulling won the distinction, on Cap and Gown Day, of election to membership in the honor society Lambda Alpha Psi, for meritorious scholarship in the field of literature in which he is majoring in his work in the Graduate School, University of Minnesota, toward the Ph.D.

A portrait painted by Boris Luban of **Henry Hurd Rusby,** dean of the college of pharmacy of Columbia University, who for forty-one years has served as professor of botany, physiology and materia medica, was presented to him by the student body on June 3rd, in the presence of pharmacists from all over the country, as part of the College Centennial and commencement exercises.

Dr. A. Richard Bliss, Jr., University of Tennessee, is vice-president of the Tenessee Academy of Science.

Mrs. Josie Wanous Stuart—who attended many A. PH. A. meetings and, it is hoped, she will again attend the meeting at Rapid City—will be hostess to the veteran druggists of Minneapolis and St. Paul on June 26th, at the Stuart home near Mound Lake, Minnetonka. The Stuart cottage is surrounded, at this time of the year, by thousands of blooming peonies and is an enjoyable spot for the luncheon.

Later in the day a meeting of the veterans, with dinner, will be held at Nicollet Hotel. **President Henry C. Kruckeberg** of the Northwest Pharmaceutical Bureau has designated this to be an A. PH. A. Pepfest, which speaks for an enjoyable occasion.

January 1929 number of the *Hospital Corps Quarterly*, published for the information of the

Hospital Corps of the U. S. Navy contains a number of interesting articles by pharmacists. The first one is on "Naval Hygienic and Sanitary Questions," by W. H. McWilliams, Chief Pharmacist of the U. S. Navy.

Another is by R. W. Gray, Pharmacist's Mate, First Class, U. S. Navy, on "Dark-Field Examination for Treponema Pallidum;" and a comprehensive contribution dealing with notes on photography is by H. F. A. Long, Pharmacist's Mate, Second Class, U. S. Navy.

Another article deals with practical suggestions by Henry Scheidegger, Chief Pharmacist's Mate, U. S. Navy.

On November 1, 1928, sixty names of Pharmacists' Mates, first-class, were on the waiting list for Chief Pharmacist's Mate, and the following promotions to Chief Pharmacist's Mate acting appointment have been made:

E. C. Beaulac, T. A. Boardman, D. H. Diamond, S. R. Giles, J. T. Havlicheck, I. L. Heim, R. J. Lyons, F. H. McGuire, F. O Tibbetts, Q. C. Tucker, O. L. Youngblood.

Promotions to Pharmacist's Mate, first-class, list the following:

R. L. Bodiford, Joe Gavin, M. H. Harford, D. W. Lacy, Benjamin Osti.

Hoffmann-La Roche Chemical Works, whose office has been for several years at 19 Cliff St., New York, has moved their general offices to its new, extensive manufacturing plant, just completed at Nutley, N. J. The firm name has been changed to Hoffmann-LaRoche, Inc.

OBITUARY.

Prominently named among those hundred and more victims of the frightful explosion in the Cleveland Clinic is **Dr. John Phillips,** the founder of the Clinic. Only a few months ago Dr. Phillips was elected as a member of the U. S. P. Committee of Revision to fill a vacancy.

According to newspaper accounts Dr. Phillips escaped from the building and walked home but was taken seriously ill and died within a few hours, although every effort known to medical science was made by his associate, Dr. Crile, to save his life.

Few of us knew Dr. Phillips personally but the Committee has lost the opportunity of knowing him and of having the benefit of his counsel and advice in the important duties still before us.—E. F. C.

Other members of the Revision Committee of the U. S. Pharmacopœia, 1920–1930, who have ceased their labors are: George M. Beringer, Henry Beates, Jr., Alexander R. Craig, J. M. Francis, M. Howard Fussell, Henry Kraemer and Albert Schneider.

The only surviving signator to the certificate of incorporation of the U. S. Pharmacopœial Convention, May 1900, is Frank M. Criswell, of Washington, D. C. Mr. Criswell attended the last joint veterans' meeting of the Baltimore and Washington, D. C. organizations.

Bishop Charles Henry Brent, of the Episcopal diocese of Western New York died at Lausanne, Switzerland, March 27th. He is known for his efforts to control opium traffic. He was for two years a member of the committee appointed by the Philippine Government to investigate the opium question in the Orient. Later he became senior member of the American delegation to the international opium commission at Shanghai. He became president of this organization in 1909 and two years later he was named chairman of the American delegation and president of the opium conference at the Hague. In 1923 he served as an American representative at the drug traffic conference at Geneva.

Nagayoshi Nagai, emeritus professor of the Imperial University of Tokyo and member of the Imperial Academy, died February 10th, aged eighty-four years.

Doctor Nagai studied chemistry and pharmacy at the University of Berlin from 1870 to 1877. After four years at the Home Office in Japan, he returned to Berlin in 1881, and was soon appointed assistant professor at his Alma Mater. Since 1883 he has devoted his life to the Imperial University. He has been a member of the Central Sanitary Committee of the Home Office and president of the Japan Pharmacological Society. He made many important researches in pharmacology, one of the most notable being the synthesis of ephedrine.

Members of the AMERICAN PHARMACEUTICAL ASSOCIATION sympathize with our fellow-member, Ezra J. Kennedy, editor of the *Pharmaceutical Era*, in his bereavement by the death of his wife, on May 19th. Mr. and Mrs. Kennedy were married about 44 years ago, and besides her husband the deceased is survived by two sons, Ezra J. Kennedy, Jr., and Frederick H. Kennedy, and four daughters,

Mrs. Edward A. Dougherty, Mrs. Ralph W. Boyd, Mrs. Herbert Bond and Mrs. Willard G. Macomber. Mrs. Kennedy was in her sixty-seventh year.

A monument has been erected in Breslau (Magdalen Cemetery) in memory of Prof. Dr. J. Gadamer, late director of the department of pharmaceutical chemistry, University of Marburg. Dr. Gadamer was an honorary member of the AMERICAN PHARMACEUTICAL ASSOCIATION.

Leroy A. Lallance, member of the AMERICAN PHARMACEUTICAL ASSOCIATION, died at his home in Bradenton, Fla., April 4th, after an illness extending over a period of about six months.

Mr. Lallance was an alumnus of the School of Pharmacy of the University of Ohio, also a graduate of The Linsley Military School at Wheeling, W. Va. For a number of years he owned a pharmacy in Wheeling and, later, became associated with the Ohio Valley Drug Company. About four years ago he moved with his family to Bradenton, Fla., where he became manager of the Thomas Pharmacy and, thereafter, was associated with the Charlotte Bay Pharmacy at Punta Gorda.

The deceased was a member of Phi Gamma Delta fraternity of Ohio State University and deeply interested in pharmacy. He is survived by his mother, widow and one son. Funeral ceremonies were held at Bradenton, and final services took place at Wheeling, W. Va.

Elmer D. Michener, president of the Philadelphia Association of Retail Druggists, died May 24th. He had been suffering for more than a month with a serious heart affection, but a rest at Atlantic City seemed to have improved his condition very much. Several days prior to his passing he had taken several drives with his wife and both were hopeful of returning strength.

The deceased was born in Duncannon, Pa., June 3, 1870, and after graduating from the Wyoming seminary at Williamsport he entered the employ of Samuel C. Henry, a druggist of Duncannon, Pa. Coming to Philadelphia he graduated from the Philadelphia College of Pharmacy and Science and later worked for Dr. Chandler, Chas. T. Clark, George B. Evans and the Broad Street station pharmacy. On April 21, 1899, he purchased the Streeter pharmacy at Twelfth and Huntingdon Streets, which he conducted successfully until the time of his death.

The death is announced of Dr. William Küster, professor of Organic and Pharmaceutical Chemistry at Stuttgart.

SOCIETIES AND COLLEGES.

THE RAPID CITY MEETING.

BY E. F. KELLY.

Present-day conditions and competition make it more necessary than ever that every one—business man, artisan, professional man, artist, scientist—keep in close contact with the developments in his own field and fully abreast of the times. It is impossible, practically speaking, for any one to do this alone, and so we have associations and other organizations where each is expected to make his contribution and take what he needs from the general fund of research and experience and inspiration.

In one short week at Rapid City, you can see and come into contact with the breadth of pharmaceutical progress—in education, in legislation, in professional practice, in commerce, in history, in standards, in research—all leading to a better profession and business for you. You can contribute your part to this progress by your presence, by a paper, a suggestion or taking part in a discussion, and go home with the satisfaction which comes from doing your bit. Give and take. You can come into personal contact with the men who are contributing most to pharmaceutical progress, which is always an inspiration.

Then the good friends out there will make the trip a happy outing for you and yours, will arrange that you see that wonderful country at its best, and will send you home better prepared to play the game hard during the next year.

And do not overlook the opportunity to combine a visit with the N. A. R. D. at Minneapolis.

Routing may be made in attending the Rapid City convention so as to not only take in this meeting, but spend a few days in the heart of the Black Hills, visit Yellowstone Park and return to Minneapolis in time for the N. A. R. D. convention. There is just time enough between conventions so that a visit to the great national playground need not be rushed.

Thus, within the space of a few weeks, one may visit the wonderland of America and its

twin metropolises, take in two national conventions and still lose no great amount of time from business activities.

Chief Crazy Horse and his squaw, 85 years old. One of the few remaining old characters.

AIRPLANE CONNECTIONS TO BLACK HILLS ANNOUNCED.

BY GEO. A. BENDER.

The Rapid Air Lines, Inc., of South Dakota are making special plans to accommodate as many druggists as may feel inclined to fly to the Black Hills to attend the A. PH. A. convention this year. The company is operating a regularly scheduled air service which brings the Black Hills many hours closer. Rates and schedules for the air route from Watertown and Huron will soon be announced.

The planes used on the line from Watertown through Huron and Pierre to Rapid City are fine, comfortable, six-place Ryan broughams. Also, if sufficient reservations are made in advance, the company will offer the use of Wamblee Okanho, a fifteen-passenger, trimotored Ford, all-metal monoplane, for the special trip.

On May 2nd the Chicago and Northwestern railroad and the Rapid Air Lines, Inc., announced connecting rail and air passenger service between Chicago, St. Paul, Minneapolis, Sioux City, Omaha and Rapid City, and since the first trip, every connection has been made exactly on time, indicating that plane-rail hookup lines are practical.

The Rapid Air Line rates are not comparable with rail rates. But for the busy man whose time is valuable, they amount to a real saving, and besides add a bit of spice to the trip. It will be possible to remain on the job until a few hours before the opening of the convention and yet make the Black Hills in time to answer roll call, and when the activities are over, a speedy trip home is assured. The following schedules are regularly in operation by the Rapid Air Lines:

Leave Huron	9:15 A.M. C. T.
Arrive Pierre	10:35 A.M. C. T.
Leave Pierre	9:45 A.M. M. T.
Arrive Rapid City	11:45 A.M. M. T.
Leave Rapid City	2:30 P.M. M. T.
Arrive Pierre	4:10 P.M. M. T.
Leave Pierre	5:20 P.M. C. T.
Arrive Huron	6:40 P.M. C. T.

It is especially interesting that anyone so desiring may go to any one of the eight thousand Chicago and Northwestern ticket agencies and get tickets over both rail and air lines, together with full information regarding schedules and connections.

D. Wayne George, publicity manager of the air lines, announces that they are also planning three scheduled Black Hills sightseeing trips which will carry people over some very interesting country. Reservations for air lines travel should be made as early as possible with the Rapid Air Lines, Inc. Any further information regarding air schedules may be obtained from the Rapid Air Lines, Inc., of Rapid City, and Huron; the Pionair Lines, of Watertown; the Chicago and Northwestern Railroad, or Geo. A. Bender, Watertown, South Dakota.

By all means—do not delay—see your railroad agent and ask him for tourist rates, summer rates, and all other information and then arrange your trip in such a way that it will give you an outing always to be remembered. Rates are obtainable for a great deal less than the usual convention rates; you can be routed by way of Yellowstone, Denver, Salt Lake City, etc. Also make your reservation by addressing the Local Secretary, F. W. Brown, Lead, So. Dakota.

PARTIAL LIST OF PAPERS RECEIVED BY THE SECTIONS.

Please look up page x of the Roster and address the chairman or secretary of one or the other sections and give him the title of your paper.

SCIENTIFIC SECTION.

June is nearly gone and even August is not far away. We hope you will have a contribution for our Section at the Rapid City, S. Dak. meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION, August 26th to 31st. However, July 25th is the dead line for acceptance of titles for the Official Program. After that papers can only be accepted if time for presentation will permit.

The following contributions are part of the program of the Section:

"Further Studies of the Cat-Eye Method for the Bioassay of Mydriatics and Miotics," J. C. Munch.

"Red Squill Powders as Specific Raticides," J. C. Munch, E. E. Horn and J. Silver.

"The Delicacy of Chemical and Physiological Tests for Strychnine," J. C Munch and J. C. Ward.

"Bioassay of Aconite and Its Preparations. 2. The Comparative Toxicity of Tincture and Fluidextract of Aconite to Guinea-Pigs and Rats," J. C. Munch and R. I. Grantham.

"Amino Alcohols. 3. The Potentation of the Action of Epinephrine by Arylpropanolamines," J. C. Munch and W. H. Hargung.

"The Influence of Light upon the Hydrogen-Ion Concentration and Stability of Certain Pharmaceuticals," John C. Krantz, Jr., and C. Jelleff Carr.

"Effect of Buffering the External Phase upon the Stability of Emulsions," John C. Krantz, Jr.

"Medicinal Herbs of the Great Smoky Mountains," K. E. Bennett.

"Native Drug Plants of Nebraska," E. T. Stuhr.

"Pacific Coast Drug Plants," E. T. Stuhr. In addition, Dr. George F. Reddish and Dr. L. C. Himebaugh will present papers at the symposium on Bacteriology of the U. S. P. and N. F.

The Chairman has arranged to make available for very early publication in the JOURNAL short abstracts of every paper presented before the Section. In return for this added service we must ask you to send your titles and short abstracts to the Secretary on or before July 25th.

The Black Hills of South Dakota beckon you, the Scientific Section will welcome you. This is our final appeal for your coöperation.

L. W. ROWE, *Secretary*,
Scientific Section, Parke, Davis & Co.,
Detroit, Michigan.

SECTION ON PRACTICAL PHARMACY AND DISPENSING.

"A Survey of the Prescription Business in the City of Buffalo," Leon Monell.

Subject to be announced, J. Leon Lascoff.

"Prescription Bottles," William J. Husa.

Subject to be announced, Robert J. Ruth.

"A New Explanation of an Old Incompatibility," Charles W. Bauer.

"A Method for the Quantitative Estimation of Chloroform in Chloroform Liniment," Alfred C. Andersen.

"A Prescription Containing Guaiac and Acacia," John C. Krantz, Jr., and C. Jelleff Carr.

"A Further Study of the Incompatibility between Sodium Bicarbonate and Sodium Salicylate," John C. Krantz, Jr., and C. Jelleff Carr.

H. C. Newton, *Secretary*,
c/o Creighton College of Pharmacy,
Omaha, Neb.

SECTION ON COMMERCIAL INTERESTS.

"Keeping Independent," Edward S. Rose.

"The Ethics of Commercialism," V. C. Michels.

"Dividing Your Inventory to Find Your Proper Rate of Turnover," W. Bruce Philip.

"The Independent Drug Store—A National Necessity," R. E. Lee Williamson.

Quite a number have promised papers but titles have not been received at this date—the program promises to be interesting.

Jos. G. NOH, *Secretary*,
Harrisburg, Pa.

R. B. Rothrock, *Chairman*,
Mt. Vernon, Ind.

SECTION ON HISTORICAL PHARMACY.

Report of the Historian, E. G. Eberle.

"History of the Illinois Pharmaceutical Association," W. B. Day.

"Sharp & Dohme, 1845–1929," Alfred R. L. Dohme.

"Shepard, Teacher and Pharmacist," Lyman F. Kebler.

Title to be announced, F. B. Kilmer.

"Writing Pharmaceutical Biography and History," Edward Kremers.

Title to be announced, Edward Kremers.

"Kava Kava (Piper methysticum)," J. T. Lloyd.

Title to be announced, John Uri Lloyd and Wolfgang Ostwald.

Title to be announced, Robert J. Ruth.

"Medical and Pharmaceutical Knowledge of Balzac," L. E. Warren.

"Reciprocity in Pharmaceutical Licensure," H. C. Christensen.

"Garcia da Orta and the First Description of Asiatic Drug Plants by a European," Louis H. Roddis.

"A Half Century of Pharmacy in Kansas," Mathias Noll.

GEO. D. BEAL, *Secretary*,
Mellon Institute of Industrial Research,
Pittsburgh, Pa.

N. W. D. A. VACATION DISPLAYS FOR RETAIL DRUGGISTS.

The National Wholesale Druggists' Association, in continuation of its policy to aid the retail druggist, announces three new window displays for the retailer to use during the vacation season. These displays are offered free by wholesale druggists to all retailers who will place them in their windows. Many wholesalers, in addition to giving the displays to their customers, have arranged combination deals of vacation merchandise which may be shown in the drug store window with the lithographed material. These deals frequently offer distinct savings to the retailer.

Already some 8000 displays, lithographed in six colors, have been distributed to retailers, to be used in increasing sales of vacation merchandise to the early spring vacationist. Just at this time wholesalers have to offer 10,000 new displays especially suited for use in drug stores during the month of June. This new display is lithographed in nine colors, and represents a real work of art. Seven beautiful vacation scenes are reproduced in the display, any one of which is suitable for framing and preserving in the home. These attention-getting pictures are accompanied with strips carrying the names of vacation merchandise, the sales of which may be increased through proper display at this time of the year. Each display is accompanied by a circular giving full instructions to the retailer as to how to install the display in his window.

STATE ASSOCIATION MEETINGS.

Dates of ASSOCIATION meetings are given in the May JOURNAL, page 532. Please note the number of Golden Anniversary Meetings.

LOUISIANA PHARMACEUTICAL ASSOCIATION.

Louisiana pharmacists held a successful meeting at Monroe. New constitution and by-laws were adopted providing for a vice-president in each congressional district.

Resolutions were adopted favoring a pharmacy corps in U. S. Army; opposing change of prohibition department; favoring appropriation by Congress for mosquito control; favoring records of sales for inspection by tax assessors.

The officers for the ensuing year are: *President*, Paul C. Weilbaecher, New Orleans; *Treasurer*, Adam Wirth, New Orleans; *Secretary*, John E. Scott, New Orleans; *Corresponding Secretary*, George Feldner, New Orleans; *Vice-Presidents*, L. Marion Legendre, New Orleans; Paul Eckels, New Iberia; C. R. Caldwell, Shreveport; E. W. Voght, Ferriday; T. L. Cronan, West Baton Rouge; Alfred B. Cobb, Jena.

OKLAHOMA ASSOCIATION.

Oklahoma Association endorsed the Capper-Kelly Bill, and the work of the AMERICAN PHARMACEUTICAL ASSOCIATION for professional pharmacy. President Denny Brann, of the N. A. R. D., was one of the speakers. A tribute was paid H. S. Caldwell, retiring secretary, and the Association presented him with a diamond stick pin as an expression of appreciation of his services.

The following officers were elected for the ensuing year: *President*, L. Dale Beaver, Fairfax; *First Vice-President*, V. Albert Eaton, Weatherford; *Second Vice-President*, C. V. Nichols, Anadarko; *Secretary-Treasurer*, D. F. McLemore, Britton.

The entertainments were of a high order and the program included a number of valuable addresses and papers.

WEST VIRGINIA.

The 23rd annual convention of the West Virginia State Pharmaceutical Association was held in Morgantown, May 22nd and 23rd, with the largest attendance in its history. Among the speakers at the meeting were: Thurman "Dusty" Miller, Wilmington, Ohio;

John A. Goode, member of the executive committee of the N. A. R. D., Asheville, N. C.; Dr. John R. Turner, President of West Virginia University, Morgantown; Ross Wells, State Commissioner of Prohibition, Charleston; Prof. C. Leonard O'Connell, President, Pennsylvania Pharmaceutical Association, Pittsburgh; Theo. D. Wetterstroem, Secretary, Ohio Pharmaceutical Association and M. N. Ford, Secretary, Ohio Board of Pharmacy, Columbus, Ohio.

Among the resolutions passed were those endorsing the Capper-Kelly Bill and the Pharmacy Corps Bill.

The officers elected for the ensuing year are: *President*, Earl L. Fortney, Fairmont; *First Vice-President*, C. H. Goodykoontz, Bluefield; *Second Vice-President*, Robert R. Pierce, Morgantown; *Third Vice-President*, J. W. Watkins, Beckley; *Secretary-Treasurer*, J. Lester Hayman, 504 Grand St., Morgantown; *Council Member*, H. C. Fueller, Wheeling.

White Sulphur Springs, W. Va., was selected as the 1930 meeting place, the exact date to be announced at a later date.

Drive through The Pinnacles.

DETROIT RETAIL DRUGGISTS' MAY PARTY.

The Detroit Retail Druggists staged a May party at their annual meeting. The *Detroit Free Press* of May 14th reported the celebration in a special issue, containing a picture of those in attendance, numbering a thousand or more; also, pictures of the officers and others prominent in Detroit drug circles.

The officers of the D. R. D. A. for 1929 are: Bernard A. Bialk, *President;* Roy Mosser, *First Vice-President;* Joseph Burniac, *Second Vice-President;* Clarence Weaver, *Secretary pro tem;* R. C. Platt, *Treasurer;* R. T. Lakey, *Editor;* Harry F. Johnson, *General Counsel.*

AMERICAN PHARMACEUTICAL MANUFACTURERS' ASSOCIATION.

The American Pharmaceutical Manufacturers' Association held its 22nd annual meeting in the Hotel Chamberlin-Vanderbilt, Old Point Comfort, Va., June 3rd–6th. The address of President R. Lincoln McNeil was comprehensive. He discussed the general relations of the Association, legislation, drug contact, drug trade relations, service features of the Association and plans for the future. He stated that conferences had been held with the American Drug Manufacturers' Association in contact with the Food, Drug & Insecticide Administration. At these meetings the work on tablets, with a few exceptions, was concluded and a study of ampuls begun. The combined contact committees have recently published their findings in the form of a loose-leaf book entitled Pharmaceutical Standards including Tolerances and Methods of Assay. This work represents thus far the results of five years of continuous cooperative effort and is a most creditable accomplishment.

President McNeil, in his address, referred to the fact that the Association is closely identified with the work of the A. Ph. A. and was represented at its annual meeting in Portland, at the National Conference on Pharmaceutical Research, and also at the meeting of the National Drug Trade Conference in Washington last December. Steps have been taken to have representation at the U. S. Pharmacopœial Convention in Washington next May.

Speaking further relative to the research program, he referred to the recent decision of the Prior Rights Board, consisting of R. R. Patch, J. H. Beal, H. V. Arny, C. N. Angst and Charles Wesley Dunn. The decision in substance is that the sole right to use a mixture of two drugs, neither of which is new, cannot be vested in any pharmacal manufacturer under existing laws.

The President commended the work of Charles Wesley Dunn and the New York office from which over 250 bulletins had been sent out during the year, covering every subject in which the Association is interested. Thanks and appreciation were also expressed to other officers and committees for their fine coöperative support.

Secretary E. F. Kelly brought greetings from the AMERICAN PHARMACEUTICAL ASSOCIATION and complimented the Association on its research and standardization promotions.

The new President of the Association is Dr. H. Sheridan Baketel, of Jersey City. The other officers are *Vice-Presidents*, E. P. Crowe, Philadelphia; H. Osterman, Seymour, Ind.; *Secretary*, J. G. Searle, Chicago; *Treasurer*, A. Mallett, Des Moines. The following were elected to the *Board of Directors:* R. Lincoln McNeil, Philadelphia; F. A. Rostofer, Columbus, O.; C. D. Smith, New York City.

The following resolutions were passed:

"Resolved, That the Association endorse the recommendations made by President McNeil in his annual address, namely:

"1. That the incoming administration issue a questionnaire to members to ascertain the Association action desired by them during the next year and formulate a program accordingly.

"2. That the semi-annual meeting be held in Washington, in conjunction with a meeting of the research board.

"3. That a part of the semi-annual meeting be given to associate members for the presentation of any matter of interest to active members.

"4. That the Association actively coöperate with the American Medical Association in the advancement of the professions of manufacturing pharmacy and medicine."

The following resolutions were also adopted:

Resolved, That the Association recommend the creation of a special committee duly representing the professions of manufacturing pharmacy and medicine to confer with the United States Department of Agriculture upon the labeling of pharmaceutical products in order than the principles of such labeling shall be clearly and duly defined for the information of all concerned.

Resolved, That the Association contact with the leading medical colleges in the advancement of the science of manufacturing pharmacy.

Resolved, That the Association endorse the efforts of the AMERICAN PHARMACEUTICAL ASSOCIATION to create a pharmacy corps in the United States Army.

Resolved, That greater economy and efficiency, in distribution be the primary subject of consideration at the next annual meeting in order to continue the study so efficiently begun this year.

Resolved, That the Association express to the United States Department of Agriculture appreciation of the constructive coöperation given to the joint contact committee.

Resolved, That the Association express to R. Lincoln McNeil its deep and grateful appreciation of his distinguished and able administration of its affairs during the past two years which has made the Association of large service to manufacturing pharmacy.

Other officers and committees rendered interesting reports and it is hoped to make further references to transactions in succeeding issues of the JOURNAL.

DETERMINATION OF VANILLIN.

Estimation of vanillin in vanilla. R. EDER AND E. SCHLUMPF, *Pharm. Acta. Helv.* (April 28, 1928); through *Pharm. J.*, 122 (1929), 30.

An accurately weighed quantity of vanilla pods, between 3 and 4 Gm. is cut on a glass plate into small slices. During this operation the pods are held in a piece of filter paper, which afterwards is used for cleaning the knife and glass plate. The cut-up material and the filter paper are extracted in a small Erlenmeyer flask with reflux condenser with 15–20 cc. H_2O, repeating the extraction 6 times. The united filtrates are shaken out in a separation funnel, six or seven times with ether, the ethereal liquids are dehydrated with Na_2SO_4 and the ether evaporated. The remaining residue is taken up with 10 cc. of boiling water, filtered through cotton wool into a glass-stoppered Erlenmeyer flask, and the wool washed twice with 5 cc. boiling water. Then a solution of 0.1 Gm. semioxamacid ($NH_2CO.CO.NH_2$) is collected, dried at 105° C. and calculated as vanillin by multiplication with 0.6413. As the precipitate is slightly soluble in water, 0.003 Gm. must be added to the calculated value.

Make your preparations early for attending the Rapid City meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION.

LEGAL AND LEGISLATIVE.

PARKER BILL—H. R. 3142.

On May 20, 1929, Representative Parker introduced the following bill; which was referred to the Committee on Interstate and Foreign Commerce and order to be printed—To provide for the coördination of the public-health activities of the Government, and for other purposes:

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That upon the request of the head of an executive department or an independent establishment which is carrying on a public-health activity the Secretary of the Treasury is authorized to detail officers or employees of the Public Health Service to such department or independent establishment, in order to coöperate in such work; when officers or employees are so detailed their salaries and allowances shall be paid by the Public Health Service from applicable appropriations.

Sec. 2. (*a*) The Surgeon-General of the Public Health Service is authorized to detail personnel of the Public Health Service to educational and research institutions for special studies of scientific problems relating to public health and for the dissemination of information relating to public health, and to extend the facilities of the Public Health Service to health officials and scientists engaged in special study.

(*b*) The Secretary of the Treasury is authorized to establish such additional divisions in the Hygienic Laboratory in the District of Columbia as he deems necessary to provide agencies for the solution of public-health problems, and facilities therein for the coördination of research by public-health officials and other scientists and for demonstrations of sanitary methods and appliances.

Sec. 3. The administrative office and bureau divisions of the Public Health Service in the District of Columbia shall be administered as a part of the departmental organization, and the scientific offices and research laboratories of the Public Health Service (whether or not in the District of Columbia) shall be administered as a part of the field service.

Sec. 4. (*a*) The Secretary of the Treasury is authorized to order officers in the reserve of the Public Health Service to active duty for the purpose of training and of determining their fitness for appointment in the regular corps, and such active duty shall be credited for purposes of future promotion in the regular corps.

(*b*) Hereafter, under such regulations as the President may prescribe, medical, dental, sanitary engineer and pharmacist officers selected for general service in the regular corps of the Public Health Service and subject to change of station shall be appointed by the President, by and with the advice and consent of the Senate; original appointments shall be made only in the grade of assistant surgeon, except as provided under Sections 5 and 6 of this Act.

Sec. 5. The President is authorized to appoint, by and with the advice and consent of the Senate, to grades in the regular corps not above that of medical director, under such regulations as he may prescribe, not to exceed a total of one hundred and ten medical, dental, sanitary engineer and pharmacist officers in the Public Health Service upon the date of passage of this Act (except commissioned officers of the regular corps). Not more than six such appointments shall be in a grade above that of surgeon. In making such appointments due regard shall be had to the salary received by such officer at the time of such appointment. For purposes of pay and pay period, said officers shall be credited only with active service in the Public Health Service and active commissioned service in the Army and the Navy.

Sec. 6. Whenever commissioned officers of the Public Health Service are not available for the performance of permanent duties requiring highly specialized training and experience in scientific research, the Secretary of the Treasury shall report that fact to the President with his recommendations, and the President, under the provision of this section, is authorized to appoint, by and with the advice and consent of the Senate, not to exceed three persons in any one fiscal year to grades in the regular corps of the Public Health Service above that of assistant surgeon, but not to a grade above that of medical director; and for purposes of pay and pay period any person appointed under the provisions of this section shall be considered as having had on the date of appointment service equal to that of the junior officer of the grade to which appointed.

Sec. 7. Any person commissioned in the regular corps of the Public Health Service under the provisions of this Act of an age greater than forty-five years, if placed on waiting orders for disability incurred in line of duty, shall receive

pay at the rate of 4 per centum of active pay for each complete year of service in the Army, Navy or Public Health Service, the total to be not more than 75 per centum.

Sec. 8. Hereafter commissioned officers of the regular corps of the Public Health Service, after examination under regulations approved by the President, shall be promoted according to the same length of service and shall receive the same pay and allowances as are now or may hereafter be authorized for officers of corresponding grades of the medical corps of the Army, except that—

(*a*) For purposes of future promotion an officer whose original appointment to the regular corps under the provisions of this Act is in a grade above that of assistant surgeon shall be considered as having had on the date of appointment service equal to that of the junior officer of the grade to which appointed; if the actual service of such officer in the Public Health Service exceeds that of the junior officer of the grade, such actual service not exceeding ten years for a passed assistant surgeon, and fourteen years for a surgeon shall be credited for purposes of future promotion;

(*b*) Pharmacists shall not be promoted to the grade of passed assistant surgeon until after five years of service in the grade of assistant surgeon and shall not be promoted above the grade of passed assistant surgeon.

(*c*) When an officer, after examination under regulations approved by the President, is found not qualified for promotion for reasons other than physical disability incurred in line of duty—

(1) If in the grade of assistant surgeon, he shall be separated from the service and paid six months' pay and allowances;

(2) If in the grade of passed assistant surgeon, he shall be separated from the service and paid one year's pay and allowances; and

(3) If in the grade of surgeon or of senior surgeon, he shall be reported as not in line of promotion, or placed on waiting orders and paid at the rate of $2^1/_2$ per centum for each complete year of active commissioned service in the Public Health Service, but in no case to exceed 60 per centum of his active pay at the time he is placed on waiting orders.

Sec. 9. (*a*) The President is authorized to prescribe appropriate titles for commissioned officers of the Public Health Service other than medical officers, corresponding to the grades of medical officers. Hereafter officers of the Public Health Service in the grade of Assistant Surgeon-General (except those in charge of bureau divisions) shall be known and designated as medical directors. The limitation now imposed by law upon the number of senior surgeons and Assistant Surgeons-General at large of the Public Health Service on active duty is hereby repealed. There is created in the regular corps of the Public Health Service the grade of senior medical director, and the salary and allowances of officers commissioned in said grade, of whom there shall be two in number on active duty, shall be the same as that authorized in Section 8 of the Act approved June 10, 1922 for the Surgeon-General of the Public Health Service.

(*b*) Hereafter the Surgeon-General of the Public Health Service shall be entitled to the same pay and allowances as the Surgeon-General of the Army; and a regular commissioned officer of the Public Health Service who serves as Surgeon-General shall, upon the expiration of his commission, if not reappointed as Surgeon-General, revert to the grade and number in the regular corps that he would have occupied had he not served as Surgeon-General.

(*c*) The officer detailed as chief of the narcotics division of the Public Health Service shall, while thus serving, be an Assistant Surgeon-General, subject to the provisions of law applicable to Assistant Surgeons-General in charge of other administrative divisions of the Public Health Service.

Sec. 10. Hereafter the Secretary of the Treasury shall appoint, in accordance with the civil service laws, all officers and employees, other than commissioned officers, of the Public Health Service, and may make any such appointment effective as of the date on which the officer or employee enters upon duty.

Sec. 11. Hereafter officers of the Public Health Service when disabled on account of sickness or injury incurred in line of duty shall be entitled to medical, surgical and hospital services and supplies under such regulations as the Secretary of the Treasury may prescribe.

Sec. 12. Hereafter the advisory board for the Hygienic Laboratory shall be known as the National Advisory Health Council, and the Secretary of the Treasury is authorized to appoint, from representatives of the public-health profession, five additional members of such council. The terms of service, compensation and allowances of such additional members shall be the same as the other mem-

bers of such council not in the regular employment of the Government, except that the terms of service of the members first appointed shall be so arranged that the terms of not more than two members shall expire each year. Such council, in addition to its other functions, shall advise the Surgeon-General of the Public Health Service in respect of public-health activities.

NATIONAL LAW ENFORCEMENT COMMISSION.

George W. Wickersham, Attorney-General in the Taft Administration, was named chairman of the National Law Enforcement Commission; the other members are:

Newton D. Baker, former Secretary of War in the Wilson Administration and now chairman of the National Crime Commission.

Frank J. Loesch, Chicago attorney and vice-president of the Crime Commission of Chicago.

Roscoe Pound, dean of the Harvard Law School and former president of the Association of American Law Schools.

William I. Grubb, Federal judge for the district of Northern Alabama.

Monte M. Lemann, New Orleans, member of law faculty at Tulane University and member of the council of the American Bar Association.

William S. Kenyon, former United States Senator from Iowa; former Assistant United States Attorney-General and now judge of the United States Circuit Court of Appeals for the Eighth Federal district.

Kenneth R. Mackintosh, chief justice of the Supreme Court of the State of Washington.

Paul J. McCormick, Federal judge for the district of Southern California.

Henry W. Anderson, Richmond attorney; formerly special assistant to the United States Attorney-General.

Ada L. Comstock, president of Radcliffe College since 1923.

NARCOTIC ADDICTION.

According to Alfred L. Tennyson, in a contributed article to the *United States Daily*, of June 3rd, "the principal source of supply of the so-called non-medical addict is that represented by narcotic drugs unlawfully introduced into this country from foreign countries, particularly those of Europe, since a very small quantity of narcotic drugs of domestic manufacture is unlawfully diverted to illicit channels, and comparatively few violations of narcotic law are reported against registered dealers and practitioners in the United States. Even with the present drug addict population of the United States as above estimated, however, the quantity of narcotic drugs so unlawfully introduced is very large, for if we assume that there are 100,000 drug addicts each requiring from six to eight or more grains of morphine daily, the yearly supply for such persons will be found to be over 20 tons."

He states further that "the prevention of the unlawful importation of this quantity of drugs and the detection, apprehension and punishment of the parties responsible therefor is the outstanding problem confronting Federal officers interested in enforcing the narcotic laws."

Vitamin D, standardization. The question of standardization of vitamin D in butter and vitamin-containing margarines. F. Flury, *Biochem. Z.*, 203 (1928), 14. *Squibb Abstract Bulletin.*

Flury vested the antirachitic action of margarines containing varying amounts of irradiated ergosterol in the form of Radiostol, the British Drug Houses product of which 1 cc. is supposed to contain 10,000 antirachitic units in oily solution. The margarine samples without Radiostol additions were found to be entirely vitamin free, as found in Röntgen examination of the bones of the young white rats used. Animals receiving daily additions of 0.1 or 0.2 Gm., respectively, of a vitamin-containing margarine (*i. e.*, 0.9 or 1.8 antirachitic units, resp., 9 million per ton) with a vitamin-D free diet showed no rachitic bone changes, in contrast to control animals receiving equivalent amounts of the best table butter. Such rachitic control animals already showed marked signs of healing after 10 days when 0.2 Gm. of the vitamin-containing margarines was administered daily. This margarine was thus found to be superior to the best sweet cream butter in point of antirachitic vitamin content. These experiments also show the importance of the valuation of vitamin-D containing preparations and confirm the reputed antirachitic value of Radiostol as 10,000 antirachitic units per cc.—E. G.

C. Leonard O'Connell, Pittsburgh, has been advanced to the presidency of Pennsylvania Pharmaceutical Association, succeeding George O. Yohe, resigned.

BOOK NOTICES AND REVIEWS.

Kurzes Lehrbuch der Chemie in Natur und Wirtschaft. Volume I, General Chemistry and Inorganic Chemistry; Volume II, Organic Chemistry. By PROF. CARL OPPENHEIMER AND PROF. JOHANN MATULA. Second edition, 1928, Georg Thieme, Verlag, Leipzig.

This work, which the chief author, Prof. Oppenheimer, modestly calls "A Short Textbook of Chemistry in Nature and Arts," is in reality not a textbook in the ordinary sense of the word, or of ordinary proportions, the first volume comprising some 566 pages and the second, about 470 pages. In my opinion, this work is undoubtedly one of the finest texts on chemistry that I have seen. The purpose of the work will be best understood by quoting a few statements made by the principal author in his preface. Prof. Oppenheimer, who is an internationally known scientist and brilliant author on chemical subjects, was led to undertake the present work at the instigation of his numerous pupils, the latter comprising persons who not only specialized in chemistry but whose principal occupation was in many cases, along other lines, among them being biologists, pharmacists, physicians, agriculturists, etc. Chemistry, as the author so aptly puts it, has an absorbing interest from two points of view. In the first place, it is one of the most prolific and abstruse pure sciences, inseparably connected in its modern aspects with the other pure sciences of mathematics and physics. On the other hand, chemistry is one of the most practical of sciences and has a direct and important bearing not only on the applied arts but also on all other natural sciences. For this reason, the authors have endeavored to satisfy the needs of both groups of readers, namely, students of chemistry from the purely scientific point of view, on the one hand, and those who are interested in the chemical aspects of other sciences and the arts, on the other hand.

The treatment of the subjects in this work is an extremely interesting and profitable one. Not only are the purely scientific aspects of any one subject given due consideration, but on almost every topic the authors provide a paragraph or two of an historical nature and there is always an invaluable section dealing with the pharmacological and physiological properties of the compounds under discussion.

The first volume is divided into two distinct parts. The first part is by Prof. Matula and deals with general chemistry. This includes really an extensive exposition of physical chemistry. The first section deals with elements, atoms and molecules. Here we find a chapter on stoichiometric laws, on the periodic system, on radio activity and on atomic structure. A second section deals with chemical aggregations and includes chapters on form of matter, gaseous, liquid and solid, on crystallography, on solutions and on colloids. A third section, entitled, Constitution, deals with chemical composition and the laws of valance and molecular structure. A fourth section entitled, Chemical Reactions, contains a general discussion of laws of chemical reaction and chemical equilibria. A fifth section is devoted to transformations of chemical energy and consists of three chapters, one devoted to thermochemistry and thermodynamics, another to electrochemistry, which deals with the whole subject of electrolysis, etc., and a third devoted to photochemistry. This first part of the first volume, dealing with general chemistry, comprises over 250 pages and is followed by the second portion of the volume, the subject of which is inorganic chemistry, by Prof. Oppenheimer.

Inorganic chemistry is treated under two distinct sections. The first deals with non-metals and the second, with metals. Under the first section are chapters on all the chemical elements, which are classed as non-metals, described in a most attractive form in the manner already mentioned above. The author writes not only of the purely chemical characteristics of the various compounds, but also makes the subject extremely interesting by pointing out historical, physiological and pharmacological bearings and the important rôle played by the compounds in nature and applied arts. The second section of the inorganic part deals with metals, which are treated in very much the same way as the previous compounds.

In the second volume, written entirely by Prof. Oppenheimer, organic chemistry is taken up and discussed over 470 pages. The matter is subdivided into four sections. The first is a general presentation of the subject, dealing with definitions and conceptions of organic chemical structure, their constitution, methods of preparation, isomerism and physical properties. The second section deals with acyclic compounds, the third section

with cyclic compounds, and the fourth with nitrogenous biocolloids. The section on acyclic compounds begins with a discussion of nitrogen-free chemicals, namely, the hydrocarbons and haloids. Here again, the extremely interesting and useful method of presentation adopted by the author is followed. Thus, for instance, under haloids, there is a very interesting and quite complete discussion of narcosis and the relation of chemical structure to pharmacological action. Another chapter in the same way discusses various alkaloids, ethers, aldehydes and ketones, always calling attention to the practical relations of the subject to the arts, pharmacy and medicine. A third chapter under the acyclic compounds is devoted to acids and their derivatives, and there are other chapters dealing with metallic substitution products of the various organic compounds considered, etc. Following the discussion of nitrogen-free compounds, nitrogenous compounds are taken up and here we have a description of the nitroso- and nitro-derivatives of amines and hydrazines, cyanides, etc. The importance of these compounds is emphasized in a discussion of the amino-acids. The next section deals with the carbohydrates, and here again, is a very complete treatment, first of the general subject and then of the special sugars and other carbohydrates and also a description of the rôle played by them in nature and in economics.

Under cyclic compounds are about one hundred pages devoted to various aromatic chemicals, which are treated with all the consideration that their importance in practical life deserves. Not only is the whole chemistry of benzol discussed in full but there is an extensive description of the more concentrated cyclic compounds, naphthalene, anthracene, phenanthrene, etc. The subject is made extremely interesting by the introduction of a great deal of useful material, such as a discussion of dyes, perfumes, etc. There is even an adequate account of the rubber industry. The alkaloids, of course, are very carefully classified and discussed, attention being paid not only to their chemical structure but also to their pharmacological and toxicological effects. The same is true of the purine derivatives and other important heterocyclic compounds. The last subdivision, dealing with so-called biocolloids, is devoted to the presentation of what is really physiological chemistry. Here we have a description of the proteins, giving their structure, as far as is known, and their detection, identification and physiological rôles. Again, another chapter is devoted to the ferments, embracing both their general and specific properties, and finally, a few pages are given to a discussion of antigens and antibodies. The complete work is printed in very clear type on excellent paper and contains seventy-two illustrations, in addition to numerous structural formulas and excellent indices. To repeat, this work, in the opinion of the reviewer, is one of the finest textbooks on chemistry that has even been written. D. I. MACHT.

The Determinations of Water by Distillation Methods by RUDOLPH J. PAULY. *Bulletin* of the University of Wisconsin, Serial No. 1503. General Series No. 1279. The author states "The reversal of the operation by which volatile oils are separated from plant materials by distillation with water, as a means of determining quantitatively the moisture content of natural or artificial products, *viz.*, by distillation with hydrocarbons and directly determining the water by measuring its volume in a calibrated receiving vessel, appears to have first been suggested by Hoffman and Sjollema within the same year—as recently as 1902." The bibliography contains quite a number of illustrations and most of the articles are briefly discussed by the author and the apparatus is described, thus giving concise information. References to distilling liquids cover a page or more and the merits of the distilling liquids are considered by the author. An enumeration of the substances analyzed covers more than two pages. The author closes with a classification of the apparatus used by various workers; the adaptability and usefulness, and references to papers, descriptions, etc.

THE QUARTERLY JOURNAL OF PHARMACY AND PHARMACOLOGY (BRITISH).

The change in the latter part of the title, which appears on No. 1 of the second volume of the *Quarterly*, is an appropriate one since the term "pharmacy" connotes the "Allied Sciences" which are ancillary or complemental to pharmaceutical science and art. The first number of the new volume is a full one, both in respect to subject-matter and usefulness. It consists of 167 text pages, comprising four research papers, three from the Pharmacological Laboratories, namely: "The Effects of Pituitary Extract and Adrenalin on Ketonuria and Liver Glycogen," by J. H. Burn and

H. W. Ling; "The Influence of Changes in Body Weight of the Test Rats on the Accuracy of the Assay of Vitamin D by Means of the Line Test," by Katharine H. Coward and Majorie R. Cambden; and "The Standardization of Tincture of Digitalis," by Frank Wokes. The other paper, on "The Taxonomic Value of Vein Islet Areas, based upon a Study of the Genera Barosma, Cassia Erythroxylon and Digitalis," by Frederick A. Leven, is from the Pharmacognosy Research Laboratory, and there is a special article by Dr. J. H. Burn on "The Present Position of Ovarian Hormones." The remaining eighty-eight pages are occupied with abstracts, the figures denoting the number of pages under each section: Alkaloids, 6; Analytical, 12; Animal Products, 3; Coloring Matters, 10; Essential Oils, 4; Fats, Fixed Oils and Waxes, 3; Glucosides, Ferments and Carbohydrates, 6; Gums and Resins, 5; Inorganic, 3; Organic Unclassified, 6; Toxicology and Forensic Methods, 3; Pharmacognosy, 2; Dispensing, 1; Galenical Pharmacy, 5; Pharmacopœia Revision Notes, 5; Notes and Formulas, 1; Pharmacology and Therapeutics, 14; Bacteriology and Clinical Tests, 1; New Remedies, 5.—From the *Journal and Pharmacist* of June 1, 1929.

OXIDIZING POWER, IRRADIATED ERGOSTEROL.

Determinations of oxidizing power of cholesterol after their irradiation, by E. Rousseau. *Compt. rend. soc. biol.*, 99 (1928), 1845, No. 37. Through *Squibb Abstract Bulletin*.

Sterols in the dried condition, or in alcoholic solutions and aqueous suspensions, that had been subjected to partial or total irradiation according to a previous report, were titrated after two hours of standing in the cold. The liquids and their yellow precipitates received additions of a $N/100$ solution of sodium hyposulphite, each mg. of reacting agent corresponding to 0.008 mg. of active oxygen. Totally irradiated alcoholic solution of cholesterol and ergosterol each showed the presence of 0.024 mg. of active oxygen. Furthermore, ergosterol totally irradiated both in the dry and aqueous suspension conditions showed active oxygen present to the extent of 0.008 mg. and 0.001 mg., respectively. At 220 mm. distance, the above being for 300 mm., similar but slightly elevated values were obtained. Cod liver oil irradiated for 20 hours indicated 0.0255 mg. of active oxygen per gram as compared with the —.0077 mg. for non-irradiated oil. Activated cholesterol (40 minutes) showed an active oxygen content of 0.2400 mg. per 0.10 Gm., at 220 mm.; at 300 mm., 0.3200 mg. For 0.50 gram of ergosterol at 220 and 300 mm. the figures were 0.4800 mg. and 0.6400 mg., respectively. It is evident that qualitative and quantitative determinations may be made to show whether a sterol, especially in alcoholic or petroleum ether solutions, has been irradiated. In addition, for a definite period of time, the active oxygen present in an irradiated sterol solution, may indicate the frequency of ultraviolet vibrations that had been employed. Wood screen test is an exception. It appears that the short wave lengths emitted by the mercury are more oxidizing in their action.—J. P.

THE HEARST PRIZE—TO GAIN TEMPERANCE.

The grand prize of $25,000 for the best plan to gain temperance, sponsored by William Randolph Hearst, was awarded to Presiding Justice Franklin Chase Hoyt of the Children's Court, New York City, grandson of the late Salmon P. Chase, who was Secretary of the Treasury under President Abraham Lincoln, and later Chief Justice of the Supreme Court of the United States.

MAGNESIUM SULPHATE IDIOSYNCRASY.

A writer in the *Medical Press*, referring to the subject of poisoning by magnesium sulphate, tells the following story:—"Some months ago a young man asked me to give him a dose of Glauber's salts; not having any handy, I gave him a teaspoonful or two of mag. sulph. An hour or so later I found he was delusioned and childish in his conversation. This condition continued all day. The following day he was mentally normal. When I referred to his condition on the previous day, he asked what he had been given, and on being informed said: 'Oh, I never can take Epsom salts.' An instance of a person taking large quantities of this drug with impunity is mentioned by the late Norman Kerr in his book 'Inebriety or Narcomania.' He there states: 'There is the recorded case of a Baptist minister's wife who acquired a liking for Epsom salts. She began at an early age with a small quantity, gradually increasing the dose till, on her death in her ninetieth year, she had arrived at the generous allowance of a pound and a half per diem.'"